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CONTENTS

Change in Anxiety Level as a Factor in Test Performance	97
<i>J. B. Bond, Jr.</i>	
Practice Teaching Performance and Resultant Achievement Motivation	104
<i>F. B. W. Harper</i>	
Graduates' Assessment of Industrial Arts Teacher Education Programs	109
<i>C. J. Ross and L. D. Stewart</i>	
Conditional Reasoning in Adolescents	118
<i>L. C. Jansson</i>	
Differential Outcome Effects in Teacher Training Research as a Result of Functional versus Structural Behavioral Recording	128
<i>J. Martin and S. Auerbach</i>	
College Trustees View Their Selection	138
<i>A. G. Konrad</i>	
Knowledge and Revolution: The Student Movement in Tsarist Society (1856-1881)	151
<i>J. McLeish</i>	
Prediction of Metropolitan Readiness Test Scores	164
<i>E. A. Blowers</i>	
BOOK REVIEW	
<i>The Forked Road</i> , D. B. Creighton	169
Reviewed by H. T. Coutts	

FACULTY OF EDUCATION
The University of Alberta

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Change in Anxiety Level as a Factor in Test Performance

The academic test performance of 110 female undergraduates was analyzed by test day anxiety, non-test day anxiety, and change in anxiety from a non-test day. The Today Form of the Multiple Affect Adjective Check List was administered on a non-test day and immediately prior to a test. Neither test day anxiety nor non-test day anxiety showed statistically reliable main effects in the analysis of test performance, but the interaction of the two was significant. Analysis of change in anxiety scores revealed that students who exhibited a high increase in anxiety on the test day performed more poorly on the test than students who had either a low increase or a high decrease in anxiety. The data support the view that an increase in anxiety exerts an interfering effect on test performance, and suggest that attempts be made to minimize increases and to decrease anxiety levels of students on test days. (Dr. Bond is Assistant Professor of Human Development in the Faculty of Home Economics, The University of Manitoba.)

High anxiety states have been found to be related to poor test performance on a variety of tasks. High test-anxious persons take longer in the solution of anagrams (Russell & Sarason, 1965), have difficulty with probability learning tasks (Dusek & Hill, 1970), and receive lower grades on academic tests (Borr, 1972; Wine, 1971; Zuckerman, 1960). The performance of entire classes, as well as of individual students, has been found to be negatively related to anxiety levels (Osterhouse, 1975).

The effects of anxiety reduction approaches have not produced consistent effects on test performance (Cornish & Dilley, 1973; Mitchell & Ng, 1972; Smith, Ascough, Ettinger & Nelson, 1971). It is not surprising that counselling approaches have reported differing results, for the theoretical relationship between test anxiety and test performance is yet to be well established. There is some evidence that "anxiety" is not a unitary concept, affecting all persons similarly. High anxious females score more poorly than high anxious males (Russell & Sarason, 1965). In addition, the type of anxiety has been shown to be an important variable (Alpert & Haber, 1960).

Borr (1972) reported a correlation between debilitating anxiety and exam score but no relationship between facilitative anxiety and test score.

Finally, there have been differing reports concerning the relationship between level of anxiety and test performance. Some investigators have reported an inverted U-shaped relationship (Fein, 1963; Grooms & Endler, 1960; Sweeney, Smouse, Rupiper, & Munz, 1970). This position states that both low and high anxiety levels are related to poor test performance; optimal test performance is associated with moderate levels of test anxiety. An alternative position is that there is an inverse relationship between anxiety and test performance (Liebert & Morris, 1967; Osterhouse, 1975; Sarason, 1972; Wine, 1971).

For counsellors and teachers to control test anxiety, the relationship between test performance and anxiety needs to be more clearly delineated. One purpose of this study was to assess the relationship between test performance and the level of anxiety on a test day. If anxiety interferes with test performance, students with high levels of anxiety on a test day should perform less well than students with low levels of anxiety on the test day.

This study also compared test performance of students exhibiting various changes in anxiety levels between a non-test day and a test day. While anxiety levels generally increase on test days, some students may decrease in anxiety. It was hypothesized that students with high increases in anxiety would perform less well than students having a low increase, low decrease, or high decrease in anxiety, due to the interfering effects of anxiety (Borr, 1972; Osterhouse, 1975; Zuckerman & Lubin, 1965).

Method

All students enrolled in a course in Family Development, 110 female Home Economics undergraduates, served as subjects. The Today Form of the Multiple Affect Adjective Check List (MAACL) was administered on two occasions, once on a non-test day, one month prior to a test, and once immediately prior to a test. The MAACL has been found to be an effective measure of anxiety (Zuckerman & Lubin, 1965). The anxiety score on the MAACL was determined for each student, and resulted in a test day anxiety score, a non-test day anxiety score, and a change in anxiety score (determined by subtracting test day anxiety from non-test day anxiety).

Following the collection of the data, median splits were used to form groups on the basis of both test day anxiety scores and non-test day anxiety scores. Anxiety measured on the test day produced a group of students ($N = 59$) exhibiting high test day anxiety, with anxiety scores greater than nine, and another group of students ($N = 51$), indicating low test day anxiety, with scores from zero to nine. Anxiety measured on the non-test day yielded a group of high non-test anxious students ($N = 52$), with scores greater than eight, and a group of low non-test anxious students ($N = 58$), whose scores ranged from zero to eight.

A second grouping procedure was used, by which the effects of change in anxiety from a non-test to a test day could be assessed. Two categories were first created on the basis of either an increase or a decrease in anxiety on the day of the test. A median split was then used for each category to establish four groups as indicated in Table 1. Eight students did not change in

TABLE 1
GROUPS BASED ON CHANGE IN ANXIETY SCORES

Group	N	Range of Change in Anxiety Scores
High Increase	32	+6 to +18
Low Increase	33	+1 to + 5
Low Decrease	20	-1 to - 5
High Decrease	17	-6 to -17

anxiety level, and their test data were eliminated from further analysis.

The dependent variable in this study was performance on a multiple choice, true-false academic test of material presented during the previous month both through lecture and independent reading.

Results

Table 2 reports the mean test performance of groups formed on the basis of both test day and non-test day anxiety scores. Analysis of variance of this data (Table 3) revealed no statistically reliable main effects of either Test Day Anxiety or Non-test Day Anxiety. The interaction of Test Day Anxiety X Non-test Day Anxiety, however, was significant $F(1,106)=3.655, p=.056$.

TABLE 2
MEAN TEST PERFORMANCE BY TEST AND NON-TEST DAY ANXIETY

		Test Day Anxiety	
		High	Low
Non-test Day Anxiety	High	61.79 (N=29)	60.52 (N=23)
	Low	58.53 (N=30)	61.10 (N=28)

TABLE 3
ANOVA OF TEST PERFORMANCE BY TEST AND NON-TEST ANXIETY

Source	df	MS	F	Probability
Test Day Anxiety	1	16.099	.585	.999
Non-test Day Anxiety	1	60.443	2.197	.137
Test Day Anxiety × Non-test Day Anxiety	1	100.575	3.655	.056
Error	106	27.515		
Total	109	28.361		

The mean test performance of groups created on the basis of change in anxiety scores is shown in Table 4. A one-way analysis of variance (Table 5) indicated that change in anxiety was a significant element in test performance, $F(3,98) = 3.625$, $p = .024$. To determine where the differences existed, a Least Significance Difference test was conducted (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). This test is a form of the Student's t , appropriate when an analysis of variance is significant, and a few groups are to be compared. A difference in mean test performance scores of 2.77 or greater was required for a significant difference at the $p = .05$ level. The significant differences in test performance, therefore, were between High Increase and High Decrease, and High Increase and Low Increase. In both instances, students exhibiting a high increase performed less well on the test.

TABLE 4
MEAN TEST PERFORMANCE BY CHANGE IN ANXIETY

Change in Anxiety	Test Performance
High Increase	58.125
Low Increase	61.939
Low Decrease	60.750
High Decrease	61.529

TABLE 5
ANOVA OF TEST PERFORMANCE BY CHANGE IN ANXIETY

Source	df	MS	F	Probability
Between Groups	3	89.271	3.265	.024
Within Groups	98	27.341		
Total	101			

Discussion

As mentioned in the introduction, a conflict exists concerning how anxiety affects test performance. In this research, neither non-test day nor test day anxiety alone were found to affect test performance. The interaction of test day and non-test day anxiety, however, was significant. Perhaps the confusion resulting from previous research is due to a lack of measurement of baseline levels of anxiety on non-test days. For students who normally are anxious, high test day anxiety might only be reflective of a normal level of anxiety; however, for students who are generally low in anxiety level, high test day anxiety would indicate an abnormal level of anxiety. Similarly, students low in anxiety on both test and non-test days would be exhibiting a normal level of anxiety on the test day; students generally high in anxiety, but manifesting low levels of anxiety on test days, would be functioning at an abnormal anxiety level on the test day.

This interpretation is strengthened by the analysis of test performance by change in anxiety levels. When compared to students indicating a high increase in anxiety, those who had either a low increase or a high decrease in anxiety performed significantly better on the test. A high increase in anxiety, when compared to the normal anxiety state, seems to produce a lowered test performance.

This study has implications for both teachers and counsellors. The nonsignificant main effects of non-test and test day anxiety, and the importance of change in anxiety scores, emphasize the necessity of knowing and dealing with students as individuals, as well as members of a class. One cannot assume that poor academic test performance is due to a general effect of being in a high state of anxiety on the day of the test; the anxiety level of the individual must be compared to the level of anxiety on a non-test day. It appears to be appropriate to minimize anxiety increase on test days, for a high increase seems to result in lower performance, and high decreases in anxiety do not produce a parallel detrimental decrease in performance.

As a final note, this research contradicts, to some extent, the findings of Hountras, Grady and Vraa (1970), which reported differences between Americans and Canadians in the relationship between anxiety and academic achievement. Their study found that for Americans, a negative relationship existed between anxiety and performance on the American College Test, while for Canadians, a positive relationship existed. In addition, high anxiety Americans had the highest grade point average, while low anxiety Canadians had the lowest grade point average. While the authors did report that anxiety should not be taken as the cause of the differences in performance between these two groups, the opposite effects of anxiety in the two groups was, and still is, in need of further exploration. Certainly studies such as that of Hountras et al. (1970) indicate the need for further research on Canadian samples.

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F. B. W. HARPER

The University of Western Ontario

Practice Teaching Performance and Resultant Achievement Motivation

Practice teaching is assumed to generate simultaneously two affective reactions, one the motive to succeed (MS) and the other the motive to avoid failure (MAF). The relative strengths of these two motives are predicted to be significantly related to the student teacher's performance in practice teaching. When MS is greater than MAF, the student teacher responds more positively and does better in the field experience than when MS is less than MAF. Two samples of men and women student teachers were assigned to the appropriate cell of a four-fold distribution of scores on a test of MS and a test of MAF. An analysis of variance of practice teaching marks showed that in the men's sample, the results confirmed the hypothesis, while in the women's sample, the hypothesis was partially confirmed. (Dr. Harper is Professor and Coordinator of Secondary Education at The University of Western Ontario in London.)

Practice teaching generates at least two important affective reactions in student-teachers. For many students, practice teaching is positively viewed as a highly relevant component of the teacher preparation program, the opportunity to get into the practical or applied aspects of teaching and demonstrate their competence at the classroom level. From a theoretical point of view, the motive which seems appropriate to this attitude of positive commitment to school practice is the motive for success (MS). In achievement motivation theory, MS is defined as a relatively stable or enduring disposition to strive for success (Weiner, 1972). The second emotional reaction which is generated by practice teaching stems from the possibility of being found wanting in the skills appropriate to competent classroom teaching performance. The student teacher will be required in his practicum setting to perform under the critical scrutiny of the supervising teacher, his college professor, and the pupils. The student teacher may be apprehensive about failing in this important endeavor, and the negative emotional reactions associated with this apprehension give rise to a tendency to withdraw from or avoid the practice teaching experience. This

potential avoidant response is defined theoretically as the motive to avoid failure (MAF) (Weiner, 1972).

Both MS and MAF may take different values along a theoretical continuum, so that it is possible for a student teacher to be high, medium, or low in either scale according to specified criteria for determining the strengths of the motives. Atkinson (1964) has postulated that both MS and MAF may co-exist in the same person, and that the individual's behavior with respect to a defined goal, will be resultant of the strengths of the two motives, one acting in a positive goal-oriented direction, and the other in a direction away from the goal, as in an approach-avoidance conflict. Weiner (1972) has suggested that when MS is stronger than MAF, an individual's resultant behavior is positive, that is, he moves towards the goal. However, when MAF is stronger than MS, the individual is placed in a conflict position. His move towards the goal will be less positive and may in extreme cases be halted altogether. So far as practice teaching is concerned, a student teacher may fall into any one of a number of possible categories of resultant motivation stemming from the interaction of these two motives. He may be high in MS and low in MAF, in which case he would be expected from a theoretical point of view to regard practice teaching in a very positive light and be eager to go out and demonstrate his competency. On the other hand, he might be high in MAF and low in MS, and look forward with considerable apprehension to his practice teaching experience, perhaps, if his anxiety is high enough, not even turning up at all at his assigned school. In between are a number of theoretical positions, including the possibility of being high in both motives at the same time, or low in both at the same time.

The question arises as to whether the actual behavior of student teachers in the practice teaching situation is predictable from this kind of theoretical formulation. That is, will practice teaching performance, as reflected for example in the grades assigned to the student-teacher, differ as a function of the interaction of these two motives. Grades in practice teaching are obviously multiply determined, and the proportion of the variance that may be attributable to the effects of these motivational factors may be small. Nevertheless if there are significant differences associated with differences in motivation, control of these variables might be important for selection, placement, or remediation purposes.

The following hypothesis was tested. Student teachers' performance in practice teaching will be a function of the relative strengths of the two motives, MS and MAF. More specifically, those students rated as high in MS and low in MAF will receive higher grades in practice teaching than student teachers rated as low in MS and high in MAF.

Operationally, the measurement of motives such as MS and MAF has been the subject of considerable controversy. Atkinson's original work used the Thematic Apperception Test (TAT) as the measure of MS, and the Test Anxiety Questionnaire as the measure of MAF. Harper (1971, 1974), Weiner (1972), and Clarke (1973) have commented on the problems associated with these two operational measures. Clarke advocated the use of the N ach scale of the Personality Research Form (Jackson, 1967) in place of the TAT. Harper (1975) found that Jackson's N ach scale and the Debilitating Anxiety Scale (Deb) of the Achievement Scale (Alpert & Haber 1960)

significantly differentiated academic achievement in college students, when used as operational measures of MS and MAF respectively. Both of these scales have high reliability and the validation data presented by Harper suggested that the two scales are worthy of further study in achievement motivation research.

Method

Subject and Procedure

Two samples of student teachers were tested, one male and the other female. The students were enrolled in a post-baccalaureate program of teacher preparation for one year. There were 292 males and 299 females. Each subject was given the Personality Research Form and the Achievement Anxiety Scale at the beginning of the professional year. At the end of the year, the practice teaching grades were calculated as an average of the various marks assigned over the periods of the practicum experience.

Scoring and Analysis

The subjects were assigned to one of four cells in a 2x2 ANOVA design, according to their scores on the two scales, MS and MAF. Subjects scoring higher than the median on both scales were assigned to the High-High cell. Subjects scoring lower than the median in both scales were assigned to the Low-Low cell. Subjects scoring above the median on MS and below the median on MAF were assigned to the High-Low cell, and finally, subjects scoring low in the MS scale and high in the MAF scale were assigned to the Low-High cell. Subjects scoring at the median level on either scale were eliminated from the statistical analysis. The practice teaching marks were then entered into the ANOVA as the dependent variable, and the corresponding *F* values calculated as in a conventional 2x2 design.

TABLE 1
PRACTICE TEACHING MARKS CLASSIFIED BY RESULTANT
ACHIEVEMENT MOTIVATION

MEN		<u>Motive for Success</u>	
		High	Low
<u>Motive to Avoid Failure</u>	High	72.88	70.82
	Low	74.86	73.15
WOMEN		<u>Motive for Success</u>	
		High	Low
<u>Motive to Avoid Failure</u>	High	74.26	72.56
	Low	74.86	73.35

Results

The practice teaching mark averages for each cell of the 2x2 distribution are shown in Table 1 for each sex separately.

The high MS-low MAF cell had the highest average practice teaching mark, while the low MS-high MAF cell had the lowest average practice teaching mark in both sexes. This finding is consistent with the hypothesis.

A 2x2 ANOVA was performed on the data. The values for *F* are shown in Table 2. In the male sample, the values of *F* are significant for both main effects. In the female sample, the value of *F* for the effect due to differences in MS is significant, but the value of *F* for differences in MAF is not significant. In neither sample is there an interaction effect.

TABLE 2
ANALYSIS OF VARIANCE OF PRACTICE TEACHING MARKS

Source	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	
MEN					
Between MAF	339.81	1	338.81	11.76	<i>p</i> < .01
Between MS	258.99	1	258.99	8.96	<i>p</i> < .01
Interaction	2.14	1	2.14		ns
Within Groups	8320.55	288	28.89		
Total	8921.49	291			
WOMEN					
Between MAF	39.62	1	39.62	1.79	ns
Between MS	212.49	1	212.49	9.61	<i>p</i> < .01
Interaction	0.78	1	0.78		ns
Within Groups	7162.56	296	22.11		
Total	7415.45	299			

Discussion

Practice teaching is a complex entity, and it is to be expected that many variables of both a personal and situational nature would interact to produce the final performance effects. It appears, from the results obtained in this study, that two of the variables which have significance for understanding performance in practice teaching are the motive for success and the motive to avoid failure. The motive for success in men and women is positively associated with getting higher grades. This finding accords with the general theory of achievement motivation that those who identify themselves as aspiring to accomplish difficult tasks and who respond positively to challenge and put forth effort to attain excellence are those who do, in fact, perform at a more effective level. Conversely, in men, the motive to avoid failure is negatively associated with getting higher grades in practice teaching. Again, this finding conforms to the theory of avoidant behavior, that those who are made anxious by competition and become

apprehensive and disabled by evaluative situations perform less well in demanding situations. Empirical testing of sample populations verifies, as Atkinson (1964) has suggested, that the two motives are often present to varying degrees in the same person at the same time. In practice teaching, the effects of the two motives are seen as a combination of their relative strengths. Student teachers who are rated as high in MS and low in MAF achieve significantly higher marks than those rated as low in MS and high in MAF. Those rated as intermediate in the two variables have practice teaching scores at an intermediate level. The hypothesis is thus sustained, though in the women's sample, the effects of the motive to avoid failure are less directly related to performance in practice teaching than is true for men. Further study of these variables with other samples will help determine whether this difference is consistent.

There are at least three possible implications of these findings for institutions which prepare teachers. First, the selection of candidates for admission may be assisted by measures of these motivational variables, along with more conventional criteria of an academic nature. Secondly, student teachers already admitted to teacher programs may be better matched to the field placements to which they are assigned if reliable and valid information about the relative strengths of these motives are known. Thirdly, remedial or therapeutic intervention with student-teachers who have potentially disabling motivational problems may be possible.

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C. J. ROSS

and

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The University of Alberta

Graduates' Assessment of Industrial Arts Teacher Education Programs

This study involved the gathering of opinions held by Alberta teachers, who reported their perceived value of teacher education programs that had prepared them to teach industrial arts in Alberta secondary schools. A list of competencies needed in order to teach the Alberta Industrial Arts Curriculum in schools was developed and incorporated into a questionnaire which was distributed to all industrial arts teachers in the province.

As a result, the composition of the teaching force was determined, on the basis of location of teacher education program. The study found that the University of Alberta program was broader in scope than any other program investigated. However, University of Alberta graduates perceived their preparation as being adequate only to teach at the junior high school level.

Although teachers educated at institutions other than the University of Alberta perceived their preparation as being of relatively higher value, the data did not support the suggestion that such programs were in fact, of greater value. (Dr. Ross is a Sessional Lecturer with the Department of Industrial and Vocational Education, and Dr. Stewart is a Professor with the Department of Secondary Education at The University of Alberta.)

The University of Alberta at Edmonton has been responsible for the preparation of industrial arts teachers since 1963, when it developed a program of teacher education designed to replace the industrial arts program then offered by the University of Alberta at Calgary. The thrust of the new program was to prepare teachers capable of implementing a technology based industrial arts curriculum. That program has operated for over a decade with little major revision.

The major purpose of this study was to determine the extent to which each Alberta industrial arts teacher perceived the value of his particular program of teacher education in developing the competencies needed to teach industrial arts in Alberta secondary schools. Irrespective of the

location of his teacher education, each Alberta industrial arts teacher is expected to teach the content specified by the provincial curriculum. However, there is no legal requirement for the University of Alberta to ensure that their program graduates do possess the competencies needed to teach that curriculum. For the sake of uniformity it was decided to accept the Alberta Department of Education curriculum as the authority on industrial arts content.

Method

The study included: (1) the development of an instrument, listing the competencies needed to teach industrial arts; (2) the identification of the industrial arts teaching force on the basis of preparation program; (3) and the gathering of opinions held by teachers towards the adequacy of such programs.

Instrument

The survey instrument was a questionnaire which incorporated a 6-point Likert-type scale. In order to maximize instrument validity the content was selected from the Alberta Department of Education curriculum for industrial arts, and validated by a panel of expert judges. Instrument reliability was maximized by the use of a large sample, in this case, the entire target population.

Another factor to be decided was the format of the response scale. The literature suggests that little noticeable difference in results occurs when either a multi-step scale or a dichotomous scale is employed. Research by Peabody (1962) found that bipolar scaled items could justifiably be scored dichotomously, dependent on the direction of the response, while Helmstader (1964) stated that Likert type scales enable "subjects to place themselves on an attitude continuum for each statement" (p. 133). It was decided to use a six-point bipolar scale (no value, most inadequate, inadequate, adequate, most adequate, excellent) for each content question, in order to force responses which reflected the direction of inadequacy or adequacy. However, as the study was concerned with perceptions of adequacy, it was further decided to collapse the data received into a dichotomous "inadequate/adequate" scale, because as Matell and Jacoby (1971) found, the conversion of multi-stepped scales to dichotomous measures did not significantly reduce either reliability or validity.

Competencies

The questionnaire was designed to elicit the specialized competencies needed to teach the Industrial Arts Curriculum in Alberta schools. As no list of industrial arts teacher competencies was available, a set was developed in the following manner.

Reference to the Alberta Department of Education Program of Studies for High School Industrial Arts (1972), the Curriculum Guide for Industrial Arts General 10-20-30 (1968), and the Junior High School Curriculum Guide for Industrial Arts (1968), led to the identification of sixteen industrial arts content areas and the specific abilities that a school student may reasonably be expected to acquire after completion of a course of study in each of the

TABLE 1
TABLE OF CONTENT AREAS AND COMPETENCIES

<u>Materials Areas</u>	<u>Materials Competencies</u>
Woods	Identification
Metals	Testing
Plastics	Hand tool use
Earths/ceramics	Machine tool use
Art metal craft	Fabrication
Leather craft	Safety procedures
Lapidary craft	Tool use comparison
Hot Metals	Tool maintenance
	Fastening methods
	Finishing methods
	Career guidance
	Instructional organization
<u>Technology Areas</u>	<u>Technology Competencies</u>
Photography	Principles
Printing	Comparison
Electricity	Component identification
Electronics	Component usage
Power Sources	Systems identification
Mechanical Transmission	Systems usage
Fluid Transmission	System assembly
Drafting	System operation
	System analysis
	Safety procedures
	Career guidance
	Instructional organization
<u>General Teaching Competencies</u>	
Apply adolescent psychology theory	
Communicate with adolescents	
Motivate and/or discipline students	
Teach both individuals and small groups	
Remedy unsafe laboratory conditions	
Handle student injury situations	
Develop a laboratory safety program	
Develop daily instructional plans	
Develop yearly instructional plans	
Inventory supplies and equipment	
Order supplies and equipment	
Budget supplies and equipment	
Organize student personnel	
Construct evaluative tests	

sixteen industrial arts content areas. Eleven skills common to the materials areas and 11 skills common to the technologies areas were identified. As it seemed logical that a successful industrial arts teacher should possess (at least) the same skills, each was redefined in the format of an industrial arts teacher competency. A further common competency was developed which dealt with the ability to organize and plan to teach each of the sixteen industrial arts content areas. Therefore, 192 competencies were identified in this manner (sixteen areas by twelve competencies each).

Another set of fourteen competencies was developed, which related to general teaching skills. By these means a total of 206 competencies were listed, as in Table 1, (192 specialized plus 14 general), which were typical of

those required of an industrial arts teacher in Alberta. The 206 competencies were representative of the sixteen industrial arts areas plus general teaching abilities, i.e. a total of seventeen industrial arts content areas.

Population and Sample

The population and sample consisted of all 414 industrial arts teachers in Alberta secondary schools during the 1975/76 school year. Teachers were contacted by mail and responses received from 331 or 80% of the population.

Results

Composition

The composition of the industrial arts teaching force, on the basis of location of teacher preparation is given in Table 2. Most teachers (64%) were prepared in Alberta, nearly one half (46%) having attended the University of Alberta program, while 18% were graduates of the superseded University of Alberta at Calgary program.

TABLE 2
QUESTIONNAIRE RETURN SUMMARY

Teacher Education Institution	<i>n</i>	% of Population	% of Returns
University of Alberta	150	36	46
University of Alberta at Calgary	60	15	18
Other Canadian Institutions	14	3	4
U.S.A. Institutions	37	9	11
Other Institutions	8	2	2
Vocational Programs	16	4	5
Non-Industrial Arts Programs	17	4	5
Invalid Returns	29	7	9
Questionnaires Returned	331	80%	
Questionnaires Distributed	414	100%	

Of the remainder, 11% were prepared by various institutions in the United States of America, while 6% had attended unspecified Canadian institutions. It was also found that 10% of the teachers had received no formal industrial arts preparation at all, although half of these teachers held vocational qualifications which permitted them to teach industrial arts in Alberta schools. Nine percent of the responses were invalid.

Program Assessment

Before completing the main portion of the questionnaire, which related to the individual industrial arts competencies, teachers assessed the adequacy of their program as general preparation to teach industrial arts to Alberta secondary school students.

TABLE 3
PERCENTAGE OF ALBERTA INDUSTRIAL ARTS TEACHERS WHO
PERCEIVE THEIR PREPARATION AS ADEQUATE

Preparation Institution	Junior High	Senior High	Total	(n)
University of Alberta	69	36	46	(150)
University of Alberta at Calgary	78	68	18	(60)
Other Canadian Institutions	64	50	4	(14)
U.S.A. Institutions	97	95	11	(37)
Other Institutions	100	86	2	(8)
Discarded returns			19	(62)

Table 3 discloses that 78% of the 60 University of Alberta at Calgary prepared teachers rated as adequate their preparation to teach industrial arts to junior high school students, as compared to 69% of the 150 University of Alberta prepared teachers. Between 64% and 100% of the 59 non-Alberta prepared teachers perceived as adequate their preparation to teach industrial arts to junior high school students. However, it should be noted that these non-Alberta figures refer to small samples and a wide variety of unspecified teacher education programs.

With regard to senior high school industrial arts preparation, 68% of the University of Alberta at Calgary prepared teachers felt adequately prepared to teach industrial arts to senior high school students, as compared to 36% of the University of Alberta prepared teachers. Between 50% and 95% of non-Alberta prepared teachers felt adequately prepared to teach industrial arts to senior high school students.

Table 4 refers to all Alberta industrial arts teachers, on the basis of teacher education program, and comprises the means of their perception of adequacy of preparation in each of the seventeen industrial arts content areas.

The table provides an overview of the types of programs, based on the opinions of Alberta industrial arts teachers. An examination of column A (University of Alberta), indicates that the program's emphasis was perceived to be towards four of the materials content areas (Woods, Metals, Plastics, Earths/ceramics), and all eight technology areas (Photography, Printing, Electricity, Electronics, Power Sources, Mechanical Transmission, Fluid Transmission, Drafting). The major perceived strength of the program was in preparation for Photography (60%).

Reference to column B (University of Alberta at Calgary), discloses that the program's emphasis was perceived to have been towards four of the materials content areas (Woods, Metals, Art Metal, Hot Metals), and four of the technology areas (Electricity, Power Sources, Mechanical Transmission, Drafting). The major perceived strength of the program was in preparation for Woods (86%), Drafting (84%), Metals (72%), Electricity (72%), and Power Sources (49%).

It appears that the major difference between these two programs is the

TABLE 4
MEANS OF CONTENT AREA COMPETENCIES BY PREPARATION PROGRAM

	(A)	(B)	(C)	(D)	(E)	Total
<u>General</u>						
Teaching	43	55	49	86	89	53
<u>Materials</u>						
Woods	48	86	46	91	86	62
Metals	39	72	72	82	100	56
Plastics	46	15	25	84	29	42
Earths/ceramics	44	20	0	17	67	32
Art Metal	8	34	9	58	100	23
Leather craft	3	17	13	77	0	19
Lapidary craft	2	9	14	46	0	9
Hot Metals	20	46	59	67	79	36
<u>Technologies</u>						
Photography	60	18	29	32	0	43
Printing	47	7	29	65	66	41
Electricity	47	72	61	73	77	57
Electronics	43	20	18	43	0	36
Power Sources	47	49	62	78	0	53
Mechanical Transmission	31	38	57	46	0	36
Fluid Transmission	48	12	55	18	23	36
Drafting	35	84	74	88	93	56
Means	36%	37%	37%	59%	50%	41%
N	150	60	14	37	8	269

Note. Letters in parentheses indicate preparation institution(s):

- | | |
|--|---------------------------|
| (A) = University of Alberta | (D) = U.S.A. Institutions |
| (B) = University of Alberta at Calgary | (E) = Other Institutions |
| (c) = Other Canadian Institutions | |

added emphasis placed by the University of Alberta on technology preparation, as evidenced by the inclusion of the content areas of Photography, Printing, Electronics and Fluid Transmission, none of which formed part of the superseded University of Alberta at Calgary program. The University of Alberta apparently attempted to develop a broadly based program which was perceived by its graduates as being generally inadequate as preparation in all but one of the industrial arts content areas. On the other hand, the University of Alberta at Calgary program which was less technology-oriented, was perceived by its graduates to provide adequate preparation for five of the industrial arts content areas.

When referring to the remainder of the table, it is noted that columns C, D, and E do not pertain to any identifiable program, but are based on geographical areas. Those 14 teachers prepared in provinces other than Alberta (column C) appear to have experienced programs with a composite emphasis towards four of the materials areas (Woods, Metals, Plastics, Hot Metals), and seven of the technology areas (Photography, Printing, Electricity, Power Sources, Mechanical Transmission, Fluid Transmission, Drafting). Similarly, teachers prepared by various programs in the United

States of America (column C) appear to have experienced programs with a composite emphasis on seven of the materials areas (Woods, Metals, Plastics, Art Metal, Leather craft, Lapidary craft, Hot Metals), and seven of the technology areas (Photography, Printing, Electricity, Electronics, Power Sources, Mechanical Transmission, Drafting).

Column C refers to eight teachers prepared outside Canada or the United States of America, and was not relevant to the study.

Discussion

The study disclosed that the University of Alberta program was perceived as providing preparation for more of the industrial arts content areas than did other preparatory programs which were investigated. Data were obtained which can identify specific competencies for which preparation at the University of Alberta was perceived as being either adequate or inadequate. By matching the perceived weaknesses against the assumed program objectives, specific competencies which appear to have been covered in insufficient depth may be located. Such information could then be used to further develop the University of Alberta program.

The results of the study have also provided base line data establishing the perceived worth of the various programs which have prepared Alberta teachers. It is difficult to make judgments about the value of the University of Alberta program in relation to the other programs. Because the research originated in Edmonton, it is possible that the responses of the University of Alberta program graduates may have been unusually critical and candid, due to a desire to provide evaluative feedback which could be used to improve that program. Conversely, graduates of non-University of Alberta programs may have been less critical (or more protective) of their particular teacher education program. Therefore, the finding that the perceived adequacy mean of the University of Alberta program was 36%, as compared to 37% and 59% for the University of Alberta at Calgary and the United States of America programs respectively, must be treated with caution. That is, it does not necessarily follow that programs which prepared industrial arts teachers in the United States of America were superior to the University of Alberta program.

Although the same questionnaire was used to investigate the various preparatory programs, the possible effects of the following factors should be considered:

1. The University of Alberta program had been in operation for less than ten years, while the University of Alberta at Calgary program ceased ten years ago. Therefore, University of Alberta graduates had taught for fewer years than had University of Alberta at Calgary graduates. The relationship between experience and opinion of program worth was not examined, as a major part of the study was concerned with the University of Alberta program. However, it is recognized that the teaching experience of non-Alberta educated teachers may range over an extended time period, which may have affected their perceptions.

2. Because the study originated in Edmonton, it is possible that University of Alberta graduates may have been more candid in their opinions than the graduates of other programs.

3. With the exception of teachers from either the University of Alberta or the University of Alberta at Calgary, who represent 46% and 18% of the sample respectively, the actual number of teachers from other educational institutions was small, (i.e. Other Canadian Institutions 4%, U.S.A. Institutions 11%, Other Institutions 2%), thereby making comparisons unreliable.

In the case of the University of Alberta, it becomes evident that the program developed along a broad base, possibly at the cost of depth in preparation, for graduates viewed themselves as being inadequately prepared to teach industrial arts to senior high school students.

The University of Alberta at Calgary program which began to phase out in 1965, apparently provided in-depth preparation in the basic areas of Woods, Metals, Drafting and Electricity. Program graduates viewed themselves as being adequately prepared to teach industrial arts to both junior high and senior high school students. It may be noted that those teachers had taught for ten or more years, consequently their assessment of that program could have been affected by the expertise which they subsequently may have acquired through teaching, although there is no evidence to support this opinion.

The viewpoint of teachers educated in the United States of America is interesting. Those teachers experienced a variety of educational programs and generally each held a very positive perception of his program's value, both in technical skill development and in professional preparation. Table 4 disclosed that those teachers perceived their preparation in General Teaching competencies (i.e. the professional component) to be of considerably more value than did teachers educated in Canada. Two possible explanations are likely. Firstly, it may be that programs in the United States of America are in fact better able to prepare industrial arts teachers for Alberta schools than any Canadian program. Secondly, the effect of being prepared in a country other than Canada may be that teachers exert more than the usual amount of effort in developing an industrial arts program in an Alberta school. Subsequently, it may appear that teaching in Alberta was less difficult than had been anticipated. Therefore, the teacher could form the impression that his preparation was superior, and the major reason for his effective teaching.

These suppositions could also explain the generally high ratings given by non-Canadian educated teachers, in comparison to the lower ratings given by Canadian educated industrial arts teachers. However, no data has been obtained to support either viewpoint.

Conclusions

Although the University of Alberta program appears to be broader in scope than other programs investigated, its graduates generally perceived themselves as being less adequately prepared to teach industrial arts in Alberta than did graduates of other programs. However, the preparation of industrial arts teachers in Alberta is an area which requires more research and development. This study examined only one aspect of that complex subject, namely, the extent to which industrial arts teachers in Alberta

perceived the value of their particular program of preparation in developing selected competencies.

Nevertheless, the results of the study have indicated some features of the University of Alberta program which require attention. Consequently, it is recommended that follow-up studies be conducted to monitor the perceived worth of that program.

This study developed and tested a method of curriculum assessment which may be a useful aid in evaluating an ongoing program of teacher education. The method yields formative data which may lead to subsequent revision and improvement of such a program.

In addition to providing the basis of the research instrument, the set of industrial arts competencies may be useful to both practising and potential industrial arts teachers as a check list, to identify deficiencies in their own preparation which may require upgrading.

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Conditional Reasoning in Adolescents

The purpose of this study was to assess conditional reasoning ability in adolescents as effected by the presence of suggestive and concrete familiar content and negations in various parts of the arguments. Four basic principles of reasoning were examined: modus ponens, inversion, conversion, contraposition. A total of 464 subjects in grades 8, 10, and 12 were given tests requiring a judgment of validity of simple conditional arguments presented in verbal form. Significant differences in performance were found among grade levels, content types, principles of reasoning, and modes (positions of a negation in the argument). Significant interactions were found between principle of reasoning and grade level, principle of reasoning and content type, and principle of reasoning and mode. (Dr. Jansson is Associate Professor in the Faculty of Education, The University of Manitoba.)

Deductive reasoning, and in particular, conditional reasoning has become the focus of a number of investigations in recent years. Arguments of four basic types have frequently been considered:

1. Modus ponens (MP)
2. Inverse (INV)
3. Converse (CNV)
4. Contrapositive (CP)

These principles of deductive reasoning are well known in both symbolic and verbal form. Each argument has two premises and a conclusion. One premise must be implication, i.e., a conditional proposition of the form *if a, then b*, where *a* and *b* are simple propositions or statements. The second premise is the affirmation or negation of *a* or *b*, giving rise to the four argument types shown in Table 1. Conclusions follow necessarily in two of these four types, namely modus ponens and the contrapositive. In the other types no conclusion follows necessarily and Table 1 shows the usual nonvalid response. Test items used in research have generally asked subjects to decide whether or not a given conclusion follows necessarily from stated premises. Such research (e.g., Ennis & Paulus, 1965; O'Brien, 1972; Jansson, 1974a, 1975) has suggested that principles 1 and 4 cause little difficulty even for many elementary school children, while items involving

TABLE 1
BASIC PRINCIPLES OF CONDITIONAL REASONING

Principle	Validity	Symbolic Form	Concrete Familiar Form	Suggestive Form
Modus Ponens (MP)	Yes	if p , then q $\frac{p}{q}$	If the dog is brown, then his name is Rover. The dog is brown. The dog's name is Rover.	If cars can whistle, then horses eat cheese. Cars can whistle. Horses eat cheese.
Inverse (INV)	No	if p , then q $\frac{\text{not } p}{\text{not } q}$	If the car in the garage is Mr. Smith's, then it is red. The car in the garage is not Mr. Smith's. The car is not red.	If rats are red, then snakes can jump. Rats are not red. Snakes cannot jump.
Converse (CNV)	No	if p , then q $\frac{q}{p}$	If the painting belongs to Don, then it is a painting of a horse. This is a painting of a horse. This painting belongs to Don.	If babies can read, then air is not fresh. Air is not fresh. Babies can read.
Contrapositive (CP)	Yes	if p , then q $\frac{\text{not } q}{\text{not } p}$	If the cat's name is not Tabby, then she is not white. The cat is white. The cat's name is Tabby.	If chickens cannot gallop, then dogs can chirp. Dogs cannot chirp. Chickens can gallop.

principles 2 and 3 are answered incorrectly, as judged by standard propositional logic, even by high school and university students.

Following the notation used in both standard logic as well as in the work of Piaget, in this paper p and q will stand for propositions, “.” for *and*; “V” for *or*; “ $\rightarrow$ ” for *implication*; and the bar or “-” for *negation*. Hence an argument may be symbolized, for example modus ponens becomes: $p \rightarrow q$, p/q .

O'Brien (1972; O'Brien, Shapiro & Reali, 1971) has suggested that, given $p \rightarrow q$, subjects frequently construct the biconditional $[(p.q)V(\bar{p}.\bar{q})]$ rather than the correct $[(p.q)V(\bar{p}.q)V(\bar{p}.\bar{q})]$. This behavior, termed “Child’s Logic” by O'Brien, is used with some consistency by subjects at all ages. Other researchers (Wilkins, 1928; Ennis & Paulus, 1965; Roberge, 1970) have focused on the semantic content of the propositions as a factor in their understanding, while Roberge (1969) and Eisenberg and McGinty (1974) have examined the effect of negations in different parts of the argument.

The present study is an examination of adolescents’ abilities to handle conditional reasoning as evidenced by their performances on test items of concrete familiar and suggestive content types. The results reported here are part of a larger investigation into differing testing procedures for conditional reasoning assessment. In this phase of the investigation, answers were sought to the following questions:

- 1) Do adolescents’ abilities to judge conditional arguments vary with chronological age (grade level)?
- 2) Do adolescents’ abilities to judge conditional arguments vary with the principle of reasoning?
- 3) Do adolescents’ abilities to judge conditional arguments vary with the type of content in the argument?
- 4) Do adolescents’ abilities to judge conditional arguments vary with the mode of the argument?
- 5) Are there significant interactions among age, principle of reasoning, content type, and mode?

6) What proportion of adolescents have mastered each of the four principles of reasoning?

The above questions refer to four important notions in this research. "Principles of Reasoning" has been covered in the introductory remarks while the following require further explication: content, mode, mastery.

Content. Content can be varied in numerous ways to determine its effect upon reasoning ability. A basic notion modified and used by others goes back to the work of Wilkins (1928), and more recently to the researches of Ennis and Paulus (1965), Ennis, Finkelstein, Smith and Wilson (1969), and Roberge (1970). The latter studies have used three content types: Concrete Familiar, Symbolic, and Suggestive. The present investigation restricted itself to the first and last of these three. Concrete Familiar content implies that vocabulary familiar to the subjects was used, and further, that the truth value of the premises was empirically neutral. Suggestive items, on the other hand, while retaining familiar vocabulary, contain at least part of one premise which is contrary to observable fact.

Mode. The term "mode" has been used in this study to identify forms of the implication $p \rightarrow q$ which contain negations in either antecedent (p) or consequent (q). Such implications are used as the first premise in a simple conditional argument. Thus there are four modes:

- 1. $p \rightarrow q$
- 2. $\bar{p} \rightarrow q$
- 3. $p \rightarrow \bar{q}$
- 4. $\bar{p} \rightarrow \bar{q}$

where both p and q are considered to be propositions containing no negations. Given one of these modes of implication, the choice of proposition and parity for the second premise (i.e., p , $\bar{p}$, q , or $\bar{q}$) determines the principle of reasoning applying to the two-premise argument. Table 2 indicates these sixteen combinations, where p_i , $i = 1, 2$ is the premise of the argument. A number of studies mentioned have investigated what is here given by row 1, while, with a few notable exceptions, little has been reported for rows 2, 3, and 4. A systematic look at both dimensions is carried out in this investigation.

Mastery. Going beyond the mere examination of means and variances, there is an interest in determining whether or not a principle of logic has

TABLE 2
NEGATIONS IN FIRST AND SECOND PREMISES OF A SIMPLE
ARGUMENT AS THEY DETERMINE REASONING PRINCIPLE

P₂ P₁				
	p	$\bar{p}$	q	$\bar{q}$
1) $p \rightarrow q$	MP	INV	CNV	CP
2) $\bar{p} \rightarrow q$	INV	MP	CNV	CP
3) $p \rightarrow \bar{q}$	MP	INV	CP	CNV
4) $\bar{p} \rightarrow \bar{q}$	INV	MP	CP	CNV

been mastered by a subject. The choice of mastery criteria is not an empirical matter, but one which requires serious consideration if the criteria are to be satisfactory. This issue is given explicit attention in the work of the Cornell Critical Thinking Project (Ennis & Paulus, 1965, 14-18) and in such articles as those by Ennis (1967) and Broudy (1961) so that a lengthy discussion will not be presented here. Suffice it to say that the result of these considerations is an operational definition which has been used in a number of studies, including this one. Studies which have a similar logical frame of reference and operational definition are thus somewhat comparable. Specifically, "mastery" is defined as a stated proportion of items correct, e.g., 6 out of 8 items correct, where a principle subtest consists of eight items. Using cumulative binominal probabilities, it can be determined that the probability of showing mastery of a principle by chance alone is approximately .02 for the format used. Such a criterion, while admittedly arbitrary, seems "reasonable."

Method

Tests

Two pencil and paper tests were used in this investigation:

1. *The Jansson Conditional Reasoning Test*, Form CF
2. *The Jansson Conditional Reasoning Test*, Form SG

These two tests contained conditional reasoning items of the two content types. An example from test form CF follows:

Suppose you know that

If the horse is black, then it is not named Flicka.

The horse is not named Flicka.

Then would this be true?

The horse is not black.

Three responses were possible and were defined as follows for the examinees:

1. YES It must be true.
2. NO It can't be true.
3. MAYBE It may be true or it may not be true. You weren't told enough to be certain whether it is "YES" or "NO".

Each test contained 32 items, 8 for each of four principles of conditional reasoning, viz. modus ponens, inverse, converse, and contrapositive. A systematic variation of negations in the first premises of the arguments was employed to construct differences in mode. A further factor in the testing was the use of concrete familiar (CF) and suggestive (SG) content in the items. Each test contained items of one type only, randomly arranged by principle and mode (the same order on both tests).

Procedure

The sample was drawn from grade 8, 10, and 12 mathematics students in four Winnipeg area schools during the winter of 1975. Students were assigned randomly to one of the two test forms, giving the breakdown shown in Table 3. Because of this random assignment, there is no reason to

TABLE 3
NUMBERS OF STUDENTS IN SAMPLE BY GRADE LEVEL AND TEST FORM

Grade	Test Form		
	CF	SG	Combined
8	96	89	185
10	63	77	140
12	68	71	139
All Grades	227	237	464

suspect that the two test groups (CF and SG) are inherently any different with respect to their logical reasoning abilities.

In order to answer the questions posed, a 3x2x4x4 analysis of variance with repeated measures on the last two factors was performed (Winer, 1962, 298-353). The first factor was that of grade level, i.e., grade 8, 10, or 12. The second factor was that of content type (or test form). The third and fourth factors were those of principle of reasoning and mode, respectively. While post hoc comparisons of means were not carried out statistically, graphing of data showed trends and interactions. Further analyses indicated the proportions mastering each principle.

Results

The dependent variable in the analysis of variance was subjects' scores on the conditional reasoning tests. These can be analyzed in terms of principle (P) or mode (M) subtests; each subtest contains eight items and hence possible scores range from 0 to 8. The analysis of variance results are given in Table 4 and a cross tabulation of means is presented in Table 5 for all four factors. The number of test items in each cell of the latter table is 2, and hence the maximum cell score is 2.00. Table 6 gives means for each principle by grade level.

The significant ($p < .001$) *F*-ratio for the factor grade level (L) considered together with the means for each level indicate significant improvement with age as students move from grade 8 to grade 12. For the factor content the significant ($p < .001$) *F*-ratio suggests that concrete familiar content is handled more easily than suggestive content when other factors are not considered. No significant ($p > .05$) interaction was detected for the factors content and grade level.

The significant ($p < .001$) *F*-ratio for the factor principles of reasoning indicates that abilities varied significantly among the four principles investigated. The means in Table 6 further suggest that the order of difficulty of the principles, greatest to least, for all grades combined, is: converse, inverse, contrapositive, and modus ponens. This confirms earlier findings (Jansson, 1975) for preservice elementary school teachers. While significant interactions of principle and content and principle and level were shown to exist in this sample, in all relevant combinations the inverse proved to be easier than the converse. That is, the inverse was easier in both contents and at all three levels. This result, while not consistent with findings in all previous studies, does seem to confirm a trend. The graph in

TABLE 4
ANALYSIS OF VARIANCE FOR GRADE LEVEL, CONTENT,
PRINCIPLE AND MODE

Source	df	MS	F
<u>Between Subjects</u>			
L (Grade Level)	2	27.99	45.77**
C (Content)	1	4.15	6.79**
L × C	2	.52	.85
Subjects within Groups	458	.61	
<u>Within Subjects</u>			
P (Principle)	3	713.70	787.17**
P × L	6	6.80	7.50**
P × C	3	3.65	4.02*
P × L × C	6	.83	.91
P × Subjects within Groups	1374	.91	
M (Mode)	3	18.55	69.40**
M × L	6	2.20	8.22**
M × C	3	9.49	35.51**
M × L × C	6	1.55	5.78**
M × Subjects within Groups	1374	.27	
P × M	9	4.76	18.38**
P × M × L	18	.73	2.83**
P × M × C	9	4.30	16.59**
P × M × L × C	18	.43	1.67
P × M × Subjects within Groups	4122	.26	

* $p < .01$

** $p < .001$

Figure 1 illustrates the LxP interaction. The grade 12 performance on the contrapositive has so far defied explanation. One might wonder if the instructions in administering the test might have been faulty. These, however, were standardized at all grade levels and schools. The grade 12 students came from two different schools in different school divisions and the LxP graph for the SG looks just like the one given in Figure 1 for CF. Thus, with the exception of the contrapositive, this investigation's results support and confirm those of others with respect to an increasing ability with age to judge deductive arguments.

Given the implication $p \rightarrow q$, the mode is determined by the locations of negations within the propositions p and q . While the factor mode had a significant ($p < .001$) F -ratio, the significant interactions suggest that no generalization can be readily made about an order of difficulty of modes, although there is generally increasing ability over the grade 8 to 12 range in all modes (except when the CP applies). The graphs in Figure 2 show the interactions of mode with level and content (CxLxM). Mode 3 (negation in

TABLE 5
CROSS TABULATION OF MEANS FOR ANALYSIS OF VARIANCE:
GRADE LEVEL, CONTENT, PRINCIPLE, AND MODE

Principle	Mode	CF			SG		
		8	10	12	8	10	12
1	1	1.59	1.65	1.78	1.63	1.70	1.90
1	2	1.45	1.56	1.63	1.52	1.56	1.75
1	3	1.53	1.75	1.85	1.61	1.64	1.86
1	4	1.49	1.35	1.69	1.30	1.45	1.63
2	1	.43	.73	.96	.27	.44	.92
2	2	.24	.11	.26	.24	.40	.58
2	3	.43	.84	1.12	.10	.14	.37
2	4	.38	.56	.91	.28	.36	.70
3	1	.17	.13	.29	.17	.13	.52
3	2	.18	.14	.16	.24	.26	.42
3	3	.39	.65	.76	.12	.32	.34
3	4	.23	.27	.44	.25	.29	.38
4	1	1.65	1.59	1.37	1.46	1.45	1.25
4	2	1.07	1.11	1.01	1.12	1.03	.76
4	3	1.08	1.48	1.46	1.22	1.30	1.28
4	4	1.96	1.21	1.28	1.46	1.58	1.32

TABLE 6
CROSS TABULATION OF MEANS: GRADE LEVEL,
CONTENT, AND PRINCIPLE

		Principles				
		MP	INV	CNV	CP	ALL
CF	8	6.06	1.47	.96	4.76	12.25
	10	6.30	2.24	1.19	5.38	15.11
	12	6.96	3.25	1.66	5.12	16.99
3 Grades		6.39	2.22	1.23	5.04	14.88
SG	8	6.05	.90	.78	5.27	13.00
	10	6.35	1.35	1.00	5.36	14.06
	12	7.14	2.56	1.66	4.62	15.99
3 Grades		6.47	1.54	1.11	5.11	14.23

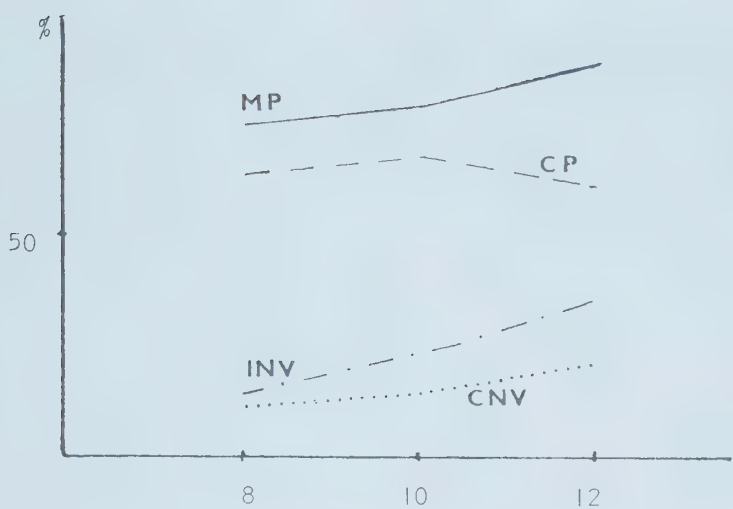
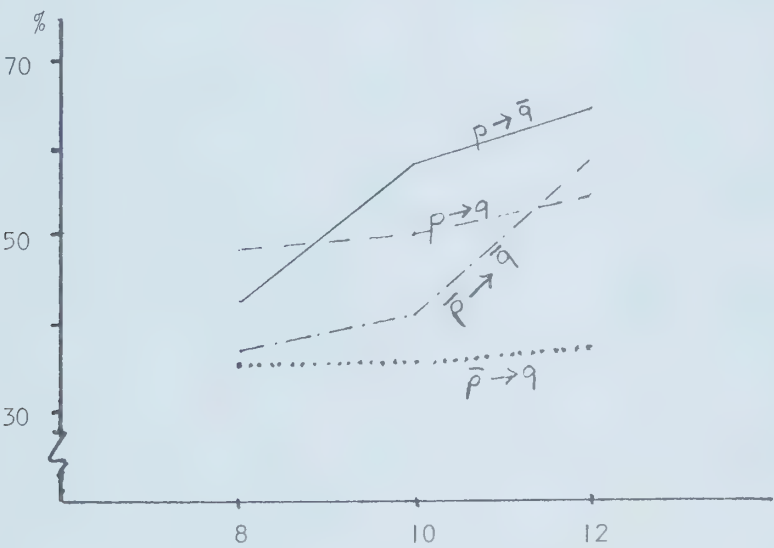
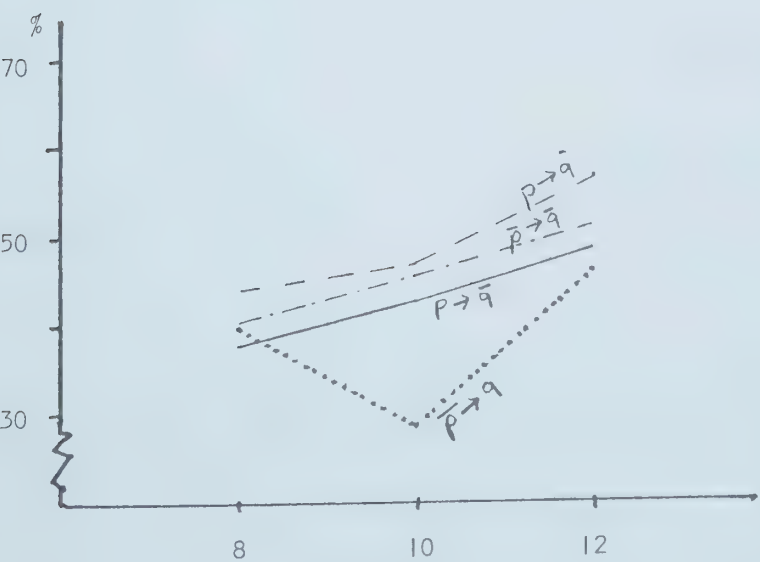


Figure 1. Grade level by principle of reasoning interaction (concrete familiar content only).



(a) Concrete Familiar



(b) Suggestive

Figure 2. Content by grade level by mode interactions.

the consequent of the first premise) was evidently more difficult in the suggestive form. Perhaps this was caused by subjects confusing it with the contrapositive form of argument. Of eight items of this type, two came from each of four principles and thus four items had as second premise some form of the consequent. Suggested by this analysis is a mode by principle interaction, which was in fact significant ($p < .001$). Examination of the mode data reveals an extremely complex picture from which no easily describable pattern emerges. The breakdown into so many components, while perhaps providing an accurate description, may lead to such complexity as to be of little pragmatic value. A linear regression analysis reported earlier (Jansson, 1974b) suggested that, in fact, for this type of test the factor principle contributed significantly more to the variance in problem difficulty than all of the other variables combined. The results on modes confirm the findings of O'Brien (1972) not only in that $\bar{p} \rightarrow q$ is the most difficult at all levels, but also that in grade 8 (9 in the O'Brien study) $p \rightarrow q$ is easiest and by grade 12 (11) $p \rightarrow \bar{q}$ was easiest, at least for concrete familiar items.

Proportions of subjects mastering each principle are shown in Table 7. While these proportions tend to run a little lower than those reported in some other studies (Ennis & Paulus, 1965; Roberge, 1970; Jansson, 1975), the general pattern of increasing mastery with age is again confirmed. The finding that the inverse is somewhat easier than the converse is repeated here also. Overall low scores are probably explainable in part by the relatively large number of negatives in the arguments of this test — fully three-fourths of the items contained a negation in the first premise.

TABLE 7
PROPORTIONS OF SUBJECTS MASTERING EACH PRINCIPLE

Principle	Grade Level			
	8	10	12	Combined
MP	.71	.76	.93	.79
INV	.06	.05	.19	.10
CNV	.01	.03	.06	.03
CP	.43	.53	.44	.46

Discussion

In looking back at the questions to which this investigation sought answers, one finds that questions (1)-(5) may be answered in the affirmative, while data on (6) has been presented in Table 7. Not only the data in Table 7, but also that in Table 6 indicate a rather low level of performance on basic logical tasks. Data of this and similar sorts collected in a number of studies, many in recent years, make it abundantly clear that neither children nor adults think according to the canons of formal logic. To put it another way, formal logic does not serve as a very good model for human reasoning.

Piaget has attempted to use elements of logic to describe formal reasoning and its development (Inhelder & Piaget, 1958), and a number of interesting studies have attempted to confirm or refute Piaget's hypotheses. Between the time of inception of this study and its conclusion an in-depth conceptual critique of Piaget's logic was published by Ennis (1975). It suffices to say here that this latter study suggests that Piaget's logical model is not adequate with respect to either logic or its description of reasoning behavior. Hopefully studies of the sort reported here will enable researchers to document such behavior more precisely and to construct more adequate models of the development of logical reasoning.

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Differential Outcome Effects in Teacher Training Research as a Result of Functional versus Structural Behavioral Recording

Teacher behavior variables in an experimental teacher training study were coded in two ways; one method of coding was based solely upon the formal structural properties of discrete teaching acts, the other method of coding was based upon the functional properties (consequential student behaviors) of discrete teaching acts. Differential outcomes on such variables as teacher questioning and reacting were associated with the different coding methods and units of analysis employed. Implications of the findings for research on teaching and teacher training programs were presented. (Dr. Martin is Assistant Professor in the Faculty of Education and Mr. Auerbach is a graduate student in the same faculty at Simon Fraser University.)

Research on teacher training is generally taken to mean research in which teachers' behaviors and characteristics serve as dependent variables, and teacher education programs and procedures serve as independent variables (Gage, 1971). Teacher effectiveness research, on the other hand, takes teachers' behaviors and characteristics as independent variables and examines their effects upon the dependent variables of pupils' learning and behaviors (Gage, 1971). Together, research on teacher education and research on teacher effects can be considered to constitute research on teaching as it has been practised over the past two decades.

Research on teacher training has been quite consistent and clear in its findings. Three main classes of independent variables have received particular attention, and their effects in changing teacher behaviors are reasonably well documented. MacDonald (1969) refers to these variables as requisites for the acquisition of teaching skills, and describes them as: (1) specifying the skill precisely; (2) providing practice under carefully structured conditions; and (3) providing prompt and specific feedback. The

same general variables are referenced by Gage and Berliner (1975) as pre-performance factors, during performance factors, and post-performance factors.

At present, a wide variety of teacher-training products (e.g., Borg, Kelley, Langer & Gall, 1970; Houston, et al., 1973; Program on Teaching Effectiveness, 1974) are available which incorporate numerous procedures aimed at increasing the impact of the independent variables of specificity, practice, and feedback. These products attempt to focus the user's (teacher's) attention upon precisely defined teacher skills via observational learning or modelling (Perry, Leventhal, & Breen, 1975), provide focussed but non-threatening theatres for rehearsal (microteaching, minicourses, etc.), and provide immediate and exact feedback with the assistance of structured observation systems (Flanders, 1970; Simon & Boyer, 1970) and/or videotape recordings (Acheson, 1964). Combined feedback from structured observation instruments and VTR equipment has now become an integral part of those teacher training procedures which have successfully changed teacher behaviors in specified and "theoretically desirable" directions (cf. Berliner, 1969; Gage & Berliner, 1975).

While research on teacher training has produced a consistent body of information, teacher effectiveness research has been largely inconclusive and unproductive. Recent reviews on teacher effectiveness (Rosenshine, 1971; Dunkin & Biddle, 1974) have attempted to identify positive relationships between teacher variables and student learning. To date, research on teacher effectiveness has identified only a few broadly defined or high inference teacher behaviors that have consistently low to moderate relationships with student achievement. A pessimistic summary of what has been learned from this research is that almost anyone who is polite to students and who presents material in a common sense way would be approximately as effective as the most highly trained "superteacher" (Winne, 1976).

Thus, the overwhelming problem posed by the most recent information from research on teaching is that it is possible to train teachers to behave in specified ways, but it seems impossible to determine which of these ways contributes to the academic achievement and social learning of children in classrooms. This is indeed a rather sobering, if not totally embarrassing, paradox for the educational researcher.

While there may be many reasons contributing to this less than desirable state of affairs, one likely element is that definitions of teaching variables have not been carefully examined for the possibility that they have varying degrees of influence under different conditions (Winne, 1976). Training techniques based on the findings of teacher training research have tended to facilitate the acquisition of discrete structurally-defined teaching skills. They have not paid particular attention to the various contexts in which such skills are employed. For example, teachers might learn to ask a greater number of higher-order questions at the end of a teacher training program, but the "appropriateness" with which they employ such specific skills might not change. That a teacher asks more conceptual or theoretical questions does not necessarily mean that he (or she) elicits more conceptual or theoretical student responses. If he asks such questions when students have

not been prepared to compare, contrast and examine relevant information, or when they have not been attending to the prerequisite discussion, such student responses are unlikely, if not impossible.

Increases in the rates with which teachers emit discrete teaching acts which purport (on the basis of one theory or another) to facilitate student learning, may well be meaningless if they are not functionally tied to preceding and consequent instructional events. The use of structural skills without the ability to discriminate appropriate stimulus contexts in which such skills might be functionally embedded, and without the ability to examine whether the emission of such skills leads to intended student responses can be rather vacuous. Conceptual questions which result in factual student responses may be structurally conceptual, but are still factual in their function. The interactive changes in student responses during actual instruction can be viewed as equivalent to short-term student learning (Becker, Englemann, & Thomas, 1971). If the application of discrete teaching behaviors does not produce such short-term learning, how can it be expected to result in significant longer-term student learning outcomes? If it is true that teacher training techniques often result in structural rather than functional changes in teaching behavior, the pessimistic findings of teacher effectiveness research are quite understandable.

The present study considered both structural and functional changes in two crucial aspects of teacher performance (teacher soliciting and teacher reacting) as a consequence of four brief teacher training treatments. A structural teaching act was recorded on the basis of formal teacher behavior independent of consequent student responses. A functional teaching act was recorded on the basis of consequent student responses. While the experiment was formally a teacher training study, its consideration of short-term interactive changes in student performance provides interesting links to the more traditional teacher effectiveness experiments. The results of the teacher training study, while interesting, must be interpreted cautiously since the small sample size, and resulting low levels of power in statistical tests, makes generalization extremely tenuous. Differential outcomes as a consequence of structural versus functional recording of teacher behaviors form the focus of the report. The experiment was thus predominately methodological in its orientation.

Method

Sample and Setting

Participants in the experiment were twelve students enrolled in the Simon Fraser University Professional Development Program. This program covers twelve months and is divided into three four-month blocks. During the five weeks of the study, the twelve students were in the second of these trimesters — a four-month in-school practicum. All subjects had been placed in elementary school classrooms (grades 1-6) in an urban centre. Their practicum work was supervised by a single faculty associate — an experienced teacher who, along with many others, had been hired by the university to provide this service. The twelve classrooms in which subjects had been placed were randomly assigned to one of four experimental conditions.

Subjects ranged in age from 19 to 26 years. Only one of the twelve had previous classroom teaching experience. The twelve classrooms were located in schools which were part of the public school system in the province of British Columbia. All offered traditional department of education curricula and presented few unique features in the way of open-areas, innovative teaching methods, special student populations, etc.

Dependent Variables and Measures

The eight dependent variables considered are defined in Table 1. The recording of all dependent variables was done from videotapes of the actual teaching sequences. Trained observers recorded numerical values (in the case of the talk variables) or frequencies (in the case of the questioning and reacting variables) on standard scoring grids consisting of matrices of interlocking squares in which rows represented different variables, and movement across columns yielded a pattern of behaviors over time. Three separate grids were employed for each of the variable classes — talk, questioning, and reacting. At the end of the recording periods, the total frequency (or numerical total) of each dependent variable was compared with the total frequency (or numerical total) for its generic class, and percentages were determined.

TABLE 1
DEFINITIONS OF DEPENDENT VARIABLES

Variable	Operational Definition
Quantity of Teacher Talk	One word remarks = 1 False starts (incomplete sentences) = 3 Complete sentences = 5
Quantity of Student Talk	One word remarks = 1 False starts (incomplete sentences) = 3 Complete sentences = 5
Factual Questions	Teacher questions which require pupils to recall isolated facts
Conceptual Questions	Teacher questions which require pupils to put facts together in explaining, making comparisons and contrasts, giving relationships, etc.
Theoretical Questions	Teacher questions which require pupils to speculate and infer from facts they possess
Closing Reactions	Teacher reactions which require no further comment from the pupils to whom they are directed
Sustaining Reactions	Teacher reactions which invite pupils to continue speaking, but do nothing to enrich or elaborate upon what they are saying
Extending Reactions	Teacher reactions which invite pupils to continue speaking, but require them to engage in more complex thinking.

Experimental Treatments and Procedures

After a fifteen-minute pretreatment recitation lesson by each of the twelve interns had been videotaped, the interns and their respective practicum classrooms were randomly assigned to one of four treatment conditions in a 2x2 factorial design. These conditions differed in terms of the feedback media employed to focus the interns' attention on their teaching performance in the areas of classroom talk, teacher soliciting, and teacher reacting.

The eight dependent variables described in the preceding section were precisely defined and modelled to all the interns in a sequential fashion over a four-week experimental period. Teacher-pupil talk was highlighted during the first week, teacher soliciting during the second, and teacher reacting during the third. The final week of the experiment was concerned with all three skill areas. The faculty associate met with each student once a week and defined and modelled the designated teacher skills during a half-hour preinstructional conference. This session was followed by a thirty-minute instructional period during which the interns practised the skills in a regular classroom setting while the faculty associate observed. All interns were told that the objectives of the four-week period were to increase the amount of pupil talk while decreasing their own teacher talk, to increase their output of conceptual and theoretical questions while decreasing their emission of factual questions, and to increase the number of sustaining and extending teacher reactions while reducing the frequency of closing reactions. Interns in all treatment conditions received an equivalent amount of skill specification and practice time.

The thirty-minute instructional periods during which the interns practised the teaching skills and attempted to change their relative emission frequencies were videotaped in two of the four treatment conditions. In two of the four treatment conditions, one which employed videotape and one which did not, the faculty associate recorded classroom talk and teacher questions and reactions on the standard scoring grids described in the preceding section. In this manner, one treatment group used neither videotape nor structured observation (C), a second used videotape alone (V), a third used structured observation alone (O), and a fourth group employed both videotape and structured observation (VO).

After each thirty-minute instructional period, the faculty associate spent some time analyzing the videotapes and/or structured observation schedules, or reflecting upon his general observations. In all conditions, this phase was followed by a forty-five-minute postinstructional feedback session between intern and faculty associate. These feedback sessions made use of videotapes and structured observation schedules where these were available. Feedback in group C was dependent solely upon recollection and reconstruction. The faculty associate attempted to employ the same level of precision in his expressive communications across all feedback conditions.

After the four weeks of treatment, a fifteen-minute recitation lesson was videotaped for each of the twelve interns. Class settings and pupils were constant across the pretreatment videotape sessions, the four treatment sessions, and the posttreatment videotape sessions.

Coding Techniques and Procedures

The twenty-four pre- and posttreatment videotapes were first coded for quantity of pupil versus teacher talk. Percentages of pupil and teacher talk were calculated for each videotape. The remaining six dependent variables (three levels of teacher soliciting and three levels of teacher reaction) were coded in two separate manners. The distinction between these two methods of coding was in terms of the unit of analysis assigned to the dependent variables. The first method coded *structural* teacher acts. If a question was formally conceptual, it was coded as conceptual whatever the level of the subsequent pupil response. The second method coded *functional* teacher acts by extending the unit of analysis to include the formal teacher acts plus subsequent pupil behavior. In the functional paradigm, a question which was formally conceptual was coded as such only if the subsequent pupil response was at the factual level, the structurally conceptual question was recorded as a factual question. Similarly, if a teacher reaction was formally and structurally a closing reaction, but the same pupil continued to talk; it was functionally coded as a sustaining or extending reaction depending upon the level of the pupil's subsequent vocalization. Percentages of factual, conceptual and theoretical questions; and of closing, sustaining and extending questions were calculated for both structural and functional coding methods.

All the coding was performed by the same observer-recorder without any knowledge of treatment assignments. A second observer coded one-third of the tapes using both the structural and functional coding techniques. Inter-rater agreements for each of the dependent measures were determined using the whole-session method (Repp, Deitz, Boles, Deitz, & Repp, 1976) averaged across the number of videotapes which both observers coded.

Results

Table 2 reports agreements for each of the dependent variables and coding methods. Teacher and pupil talk were not coded functionally as "amount of talk" is a structural variable by definition.

Two-way ANOVAs on the dependent variables pretreatment values

TABLE 2
AVERAGE INTER-RATER AGREEMENTS FOR ALL DEPENDENT VARIABLES

Dependent Variable	Structural (%)	Functional (%)
Teacher Talk	89	--
Pupil Talk	87	--
Factual Questions	72	83
Conceptual Questions	77	75
Theoretical Questions	82	78
Closing Reactions	69	92
Sustaining Reactions	75	90
Extending Reactions	88	89

yielded no significant differences between treatment groups, for either functional or structural data, confirming that the random assignment procedures produced equivalent groups with regard to the variables under investigation. Two-way ANOVAs were then performed on the posttreatment values. One series of ANOVAs used the structural data, another series used the functional data. In the absence of pretreatment differences between groups, these analyses were sufficient to demonstrate the hypothesized differential outcomes attributable to the different coding techniques. Results significant at $\alpha = .10$ are reported since this level of significance best represents the trends in the data.

Marginally significant *F* values appeared for the interaction effect between videotape feedback and feedback from structured observation instruments on the student talk and teacher talk variables. The treatment groups which received videotape feedback (V) or structured observation feedback (O) alone were associated with a greater amount of student talk (and therefore a lesser amount of teacher talk) than were the groups which used both (VO) or neither (C) feedback modalities.

TABLE 3
MEANS FOR ALL TREATMENT GROUPS ON ALL POSTTREATMENT
DEPENDENT VARIABLES

Variable	C Group	V Group	O Group	VO Group
Teacher Talk	72.20	53.77	57.13	70.07
Student Talk	27.80	46.23	42.87	29.87
Factual Questions (Structural)	76.67	63.67	31.50	61.67
Factual Questions (Functional)	62.33	65.73	62.37	78.90
Conceptual Questions (Structural)	14.33	30.67	45.83	20.00
Conceptual Questions (Functional)	35.60	24.40	27.93	20.03
Theoretical Questions (Structural)	9.00	5.67	22.67	18.33
Theoretical Questions (Functional)	2.37	9.86	9.70	1.07
Closing Reactions (Structural)	45.73	29.20	27.23	35.30
Closing Reactions (Functional)	73.20	85.30	86.27	71.53
Sustaining Reactions (Structural)	35.16	42.50	54.00	39.33
Sustaining Reactions (Functional)	19.00	10.81	10.53	19.47
Extending Reactions (Structural)	19.11	28.30	18.77	24.37
Extending Reactions (Functional)	7.80	3.89	3.20	9.00

Analyses of the structural data for teacher questioning and reacting variables yielded statistically significant results for factual questions and closing reactions. For factual questions, there was a significant main effect for the structured observation factor and a significant interaction effect between videotape and structured observation factors. Both results are attributable to a very low mean percentage of factual questions (as compared to the other treatment groups) associated with the structured observation alone (O) treatment.

The significant interaction effect between videotape and structured

TABLE 4
ANOVA SUMMARY TABLES OF SIGNIFICANT RESULTS

	Source	Sum of Squares	df	Mean Squares	F ratio
Teacher Talk	Video (V)	22.688	1	22.688	.12
	Structured Observation (O)	1.141	1	1.141	.01
	Interaction (I)	737.900	1	737.900	3.88*
	Error (E)	1521.279	8	190.160	
Student Talk	V	22.140	1	22.140	.12
	O	1.268	1	1.268	.01
	I	741.040	1	741.040	3.88*
	E	1527.558	8	190.945	
Factual Questions (Structural)	V	867.000	1	867.000	2.50
	O	1865.720	1	1865.720	5.36**
	I	1489.791	1	1489.791	4.28*
	E	2784.656	8	348.082	
Closing Reactions (Structural)	V	53.763	1	53.763	.45
	O	115.320	1	115.320	.96
	I	453.870	1	453.870	3.78*
	E	960.952	8	120.119	

* $p < .10$
** $p < .05$

observation factors for closing reactions is attributable to a low percentage of closing reactions in Group O. This score was significantly lower than that of Group C which utilized neither feedback mechanism.

On the basis of the analyses performed on the structural data it would appear that the treatment group which received feedback from structured observation instruments (Group O) moved in the desired treatment directions more than any of the other three groups. Unfortunately, similar analyses performed on the data derived from functional coding did not isolate any significant treatment effects with respect to teacher questioning and reacting variables. It is this difference in outcomes as a consequence of different recording methods which forms the focus of the following discussion.

Discussion

While the success of teacher training research as compared to teacher effectiveness research is no doubt attributable to several factors, it seems not unlikely that the structural-functional dichotomy illustrated herein plays at least some part. Structural teacher acts are most often the dependent variables in teacher training research. These variables have been successfully affected (in terms of changes in their emission frequencies) by a variety of training procedures and programs (cf. Gage & Berliner, 1975). The problem

has been that when these same structural teacher behaviors act as independent variables in teacher effectiveness research, they generally produce little systematic alteration in pupil learning outcomes.

The functional short term effects upon pupil performance of structurally-defined teacher behaviors have unfortunately tended to be ignored. While behaviorally-oriented educational psychologists (Becker, Englemann, & Thomas, 1971; O'Leary & O'Leary, 1972; Thoreson, 1972) have long advocated the notion of teaching as a series of tri-member contingencies in which the teaching act is functionally effective and meaningful because of its relationship to immediately antecedent and consequent pupil behaviors, more traditional research on teaching has not adopted a research strategy compatible with this conceptualization. If the teacher effectiveness researcher wishes to link teacher activity with long-term learning outcomes, he might be well advised to very carefully consider short-term interactive changes in pupil behavior as a function of discrete teacher acts. As mentioned earlier in this paper, it seems almost metaphysical to suppose that desirable long-term changes in pupil performance will materialize in the absence of such short-term alterations. If the whole is at least the sum of its parts, teacher effectiveness research should pay more attention to the "parts".

Berliner (1976) draws attention to this same problem in his discussion of problems associated with the determination of the "correct" unit of analysis assigned to the independent variable in teacher effectiveness research. Is the appropriate unit the teacher behavior, teacher behavior plus wait-time, teacher behavior plus wait-time plus student response, or something even larger? The importance of this question cannot be overemphasized if teacher effectiveness research is to be of any particular value in accruing knowledge about the nature of teaching and its effects on pupils. The training study included here resulted in changes in the emission frequencies of discrete teacher behaviors, but when these behaviors were functionally linked to actual consequent student acts, changes evaporated. Further, the a priori assumption that higher levels of teacher questions and reactions result in lower quantities of teacher talk (greater quantities of pupil talk) seemed to be easily inferable from the structural codings; but when the functional analyses came up empty, the impression was that dependent variables other than those studied determined the actual changes in talk ratios. Thus not only does the choice of different units of analysis result in different outcomes, it also leads to the formulation of inferences which may be more or less the product of a priori theorizing than of empirical reality.

Perhaps one of the most interesting suggestions for further study which emanates from the present consideration of methodology is that teacher effectiveness might be associated with the extent to which a teacher uses specific teaching skills which have the desired relationship to subsequent student behaviors. The ratio of "successful skill emissions" (in terms of student response) over "unsuccessful skill emissions" (again, determined by student response) might be found to be of considerable utility as an independent variable in its own right.

The implications of such ideas for teacher training might be that interns should be more carefully trained in discriminating specific classroom

Differential Outcome Effects in Teacher Training

contexts in which particular skills are likely to have desired short-term effects and in assessing, on the basis of subsequent student activity, whether or not such desirable relationships actually do occur. At the very least, one can certainly posit that such discrimination and assessment skills are as important as the ability to emit a particular skilled behavior at a high frequency without sufficient contextual concern.

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A. G. KONRAD

The University of Alberta

College Trustees View Their Selection

Community college trustees in Alberta are appointed by the provincial government. Very little is known about the selection procedure; the purpose of this article is to examine the present methods of selection and how trustees view them.

Research is reported which ascertains the perceptions of 35 newly-appointed board members. Most of the trustee respondents expressed strong satisfaction with the present selection procedures and with the provision for faculty and student memberships. However, there was some dissatisfaction with the manner in which the chairperson was selected, and the fact that college presidents have voting memberships on their college boards.

Concerns were noted by the respondents regarding lack of information about trustee selection procedures, dangers associated with political patronage, time delays in making appointments, presidential memberships on boards, "rubber stamping" faculty and student appointments, and the method of selection of board chairpersons. Suggestions were also made about possible means of improvement. These suggestions dealt primarily with means of removing the political overtones from the process and providing better information about selection procedures and criteria. (Dr. Konrad is Professor of Educational Administration at the University of Alberta.)

Members of postsecondary governing boards in Alberta are appointed by the Lieutenant-Governor by an Order in Council upon the recommendation of the Minister of Advanced Education. How newly-appointed college board members view their selection and the overall process was the topic of a recent research project at the University of Alberta (Konrad, 1974).¹ In this article the present procedures of selecting college board members are briefly reviewed following which the views of newly-appointed board members regarding these procedures are examined.

Alberta College Trustees

Public postsecondary institutions in Alberta are provincial in scope; they do not serve geographically defined regions. Although governance patterns have changed somewhat throughout the development of the current system

and vary also among the different types of institutions, today all postsecondary institutions are responsible to government through the Department of Advanced Education.

The six public colleges established prior to 1975 operate under the direction of governing boards comprised of five lay members appointed by government, the president of the college, one faculty and one student representative. Public members serve three-year terms, once renewable, and are appointed on a rotational basis. Institutional members serve one-year terms which may also be renewed. The chairperson of a board also serves a three-year term by government appointment. All terms begin on July 1.

Research Procedures

The purpose of the study was to ascertain the views of newly-appointed board members about their selection and the overall process. No attempts were made to examine the role and functioning of college boards; this study was delimited to an examination of the process followed in selecting new board members.

During the eighteen-month period of the study, ending in the spring of 1974, thirty-seven persons were newly-appointed or re-appointed to college boards in Alberta. All but two of the trustees agreed to cooperate in the study. Of the 35 board members who participated, nineteen were lay members appointed by government from the public-at-large, eight were faculty and eight were student representatives. Because college presidents serve on their boards by virtue of office and, consequently, cannot reflect on the question under study through personal experience, they were excluded from the study. Trustees who had not been appointed recently were also excluded, because their perceptions may have lost some precision over time.

Board members were interviewed in person to determine their perception of the procedures used in their nomination and selection, to solicit their opinions regarding institutional membership on boards and to obtain suggestions for improving selection procedures. All interviews were tape recorded and full transcripts prepared for content analysis.²

Research Findings

Eight general questions were used as a guide in interviewing. The first two focused upon background experiences and were somewhat preliminary; the remaining six centered on the personal perceptions of board members regarding their selection.

Background Experiences

1. *What community activities were you engaged in prior to your appointment to the board?* All but one of the 19 lay members had engaged extensively in some kind of community activities. Seven had been members of service clubs; three had served on school boards; and others had participated in groups such as civic advisory boards, chambers of commerce, business and professional groups, parent-teacher associations and church organizations.

In addition to their involvement in community activities on a voluntary basis, nine respondents (47%) had held public office at the municipal level

and three others had held positions at the provincial level. Of these, 50 percent were elected offices. Board members appear to be drawn from the "active" sector of society, providing public service both through formal and informal avenues.

But board members do not present a uniform background. One lay respondent offered the following:

I really think that the Lieutenant Governor in Council, perhaps with the advice of . . . , made an effort to find people . . . with different backgrounds and with different interests and from different religious and ethnic backgrounds.

Previous involvement in some aspect of community life prior to board appointment appears to characterize newly-appointed college trustees.

2. *What was the nature of your involvement in party politics?* Table 1 indicates the political party associations of newly-appointed board members. Although none had held elected governmental office, a majority (63%) of those interviewed had served in some official capacity within the various political parties. Two had been candidates for political office and three had served in executive positions. Only seven indicated no previous affiliation with party politics.

TABLE 1
POLITICAL INVOLVEMENT OF PUBLIC MEMBERS (N = 19)

Nature of Involvement	Response	
	No.	%
Candidate for office	2	10.5
Executive officer	3	15.8
Campaign manager	4	21
Fund raiser	1	5.3
Party member	2	10.5
No affiliation	7	37

Views regarding the significance of party politics in the appointment of public members varied considerably. One trustee who had been charged by faculty that her appointment was a "political one" acknowledged, "I can understand why people would think this, with the association that my husband and I have with political figures." Another confided, "I just happen to be a woman from the right political party with the right experience and, presumably, they wanted some type of balance, so they picked me." She hastened to add, "If it was just political, we would have an awful problem." Political patronage appears to be present in the appointment of college trustees, but the real concern lies with whether or not it results in the appointment of poorly qualified persons. A rather caustic criticism was levied at the government by a faculty board member:

I think it's ghastly, you know. A guy gets stuck on something, because he ran as a political candidate . . . and didn't make it. And he hasn't got much of a job, and they stick him on this thing as a holding action.

Similarly, a lay member emphasized the necessity of caution in making "political" appointments:

It depends so much, I think, on the integrity and the ability of the Minister or those people ultimately responsible for the appointments, as to whether or not people who are appointed as political hacks are just given an honorary position because of past political service.

While the dangers of political patronage were readily acknowledged, several respondents disavowed its influence in recent appointments.

Well, it's always been my belief that political affiliation should have nothing to do with government appointments . . . , particularly so with respect to an educational institution. I'm personally satisfied that it didn't have any influence with regards to the appointments at [this] college. (Public member)

A student member, reflecting upon her board experiences, replied,

I think we're very fortunate in that our board does not seem to be a particularly political kind of group. . . . I got the impression that in other places [of Canada] it's much more strongly a political kind of appointment.

So much for political involvement, its influence and potentially detrimental effects on the selection of board members.

Personal Perceptions

3. *Can you comment on your nomination and appointment?* Vacancies on college boards are announced in the major newspapers of Alberta when nominations are being received by the government. All but two of the public members were aware of the person or group that had nominated them for office. As Table 2 shows, seven (37%) indicated that they were nominated by a Member of the Legislative Assembly (MLA). In the majority of these cases, the contact had been made by a local MLA, but at least in three instances the Minister had become personally involved in the nomination. "I think that I was drafted, pure and simple," responded one board member. "He [The Minister] put the pressure on that he'd like me to consider it." But pressure came not only from government sources. One newly-appointed board member recalled that he was "kind of forced into it" by another board member.

Information regarding actual selection procedures is nonexistent. Respondents knew neither the steps that had been followed nor the criteria that had been used in making the final selection from among the nominees.

TABLE 2
NOMINATION SOURCE OF PUBLIC MEMBERS (N = 19)

Source of Nomination	Response	
	No.	%
Member of Legislative Assembly	7	36.8
Service Club	3	15.8
College board member	2	10.5
Professional colleague	2	10.5
Other (Citizens' committee, school board, self)	3	15.8
Unknown	2	10.5

(It may be assumed that persons nominated directly by a government source felt assured of their appointment.) As one respondent put it, "I think some of the mystery of it could come out of it [the process]." No dossiers had been required and no interviews conducted. There was "no communication from anybody" between the submission of the nomination and the contact to ascertain the willingness for service.

Generally, successful candidates were contacted by telephone and asked whether they would accept the appointment if selected. Notification of appointment itself usually followed at short notice. From these interviews it appears that the government is centrally involved in the selection procedures — even to the extent of keeping to itself information about the process and the specific criteria employed.

4. *How do you feel about the selection process involving public members?* Table 3 reveals that 79 percent of the public members expressed general

TABLE 3
OPINIONS ON SELECTION PROCEDURES

Response Category	Public Members N=19	Faculty N=8	Students N=8
Satisfied with public selection	79%	50%	12.5%
Dissatisfied with public selection	21	50	75
No response ^a	0	0	12.5
Satisfied with institutional selection	63	100	100
Dissatisfied with institutional selection	5	0	0
No response ^a	32	0	0
Satisfied with number of institutional representatives	52	25	50
Increase faculty representation ^b	21	37.5	0
Increase student representation ^b	21	50	25
No response ^a	26	12.5	25
Favour presidential membership	11	25	12.5
Opposed to presidential membership	26	25	12.5
No response ^a	63	50	75
Satisfied with chairperson selection	16	0	0
Dissatisfied with chairperson selection	58	0	0
No response	26	100	100

^a In most instances this category includes respondents who did not comment on this item--the interviews were only partially structured.

^b These are not mutually exclusive categories; some respondents were counted twice.

satisfaction with their selection; faculty opinion was equally divided on the appropriateness of the selection procedures, while students declared strong dissatisfaction with them. The advertising of appointments, so that any citizen may put forward the name of someone who he thinks is suitable, in the opinion of a public member, is the most attractive feature of the process.

It was readily acknowledged that the selection procedures placed a lot of power into the hands of the Minister. That appointments are largely political was acknowledged by 36 percent of the public members. "He [The Minister] is bound to promote his friends," criticized a student. A public member countered,

But it's a hard thing to stay away from because, really, a politician is going to appoint someone he knows. He's going to appoint somebody he thinks is capable. Well, let's face it, the people that he's going to know best are the people he's worked with.

The most obvious alternative to the appointive process would be an elective procedure. Election of board members was favoured by 18 percent. Generally, support for adopting an elective approach was based upon the view that it would be "a more democratic" way of selecting trustees. However, if the process were to be elective, countered one public member, "I think it would destroy a great deal of its effectiveness."

Three major factors identified in support of retaining the appointive process related to constituency, cost and the quality of the candidate. Since community colleges are provincial institutions, it would be difficult to identify the constituents for a general election, suggested a public member. Furthermore, it would be very expensive to conduct election campaigns, and many trustees felt that such costs would not be warranted.

The primary objection to selecting trustees by popular election had regard to the quality of the candidate. Indeed, a number of trustees admitted that they would not have submitted themselves to the "scarey," "difficult" hassles of campaigning. "Quite often," summarized one respondent, "people that would make excellent board members would never seek an election."

Some also felt that appointed members had stronger service motives than elected members would have. "Now I consider it more of a service," testified a respondent, "whereas if I had run for the position then I would think it could be more of a personal ambition." Of course many disagreed with these views. A faculty member rejoined, "The thing that bothers me is that the people who are appointed to the board seem to take it as an honour rather than as a duty."

Two complaints regarding the present procedures were frequently expressed — one had to do with the selection criteria and the other with timing. "My only comment is that I don't know very much about it," responded a faculty member. And then he explained, "I don't know what sort of criteria are used for the selection of public members, nor do I know how the criteria are applied. I'm not even sure who makes the final selection." Similarly, a public member thought it would be a good idea "for the other board members to know how people came on, and even for the community at large" to know more about the process.

With respect to timing, respondents charged government with inordinate delays in making appointments. Evidently this was true not only of public

members, but also with respect to the “formal” appointment of institutional members. A public member recalled an instance where a student had no vote “because there had been no letter to the board of her appointment.” Somewhat sarcastically the member continued, “Why do they have to rubber stamp it in Edmonton?” In general, however, the present procedures were regarded favourably by newly-appointed trustees.

5. *What are your views regarding faculty and student membership, and the procedures involved in their selection?* Almost without exception, respondents commented favourably on faculty and student membership on governing boards. The following comments are representative of enthusiastic support for institutional memberships:

I think it is imperative that you have student representation. Let’s face it, without students there wouldn’t be a college, and there wouldn’t be teachers. (Student member)

The representatives that we’ve had from both faculty and the students have been excellent. They were very good, very conscientious and, certainly, they were able to bring points of view to the board that would otherwise not have been there. (Public member)

In the discussion of institutional memberships, respondents generally agreed that faculty and students served as full-fledged board members. As one public appointee put it, “A board member is a board member, whether he is a student member or a faculty member or a community member.” Faculty members were particularly persuasive on this point. “I think that it is not the role of the person to serve as a representative of the Faculty Association,” maintained a faculty board member, “but more as a faculty person who sits on the board.” Faculty and student members provide unique perspectives to board discussions, but they do not regard themselves “accountable” to their respective associations. “What I vote on in a board meeting may not necessarily be good for the students in one particular instance,” conjectured a student member, “but it is good for the whole community.”

Some factors apparently make it difficult for institutional members to function effectively. Occasionally, issues arise which appear to place institutional members into positions of conflict of interest. An example of such a situation was seen in the negotiation of faculty salaries.

Another impediment to effective institutional membership on boards identified by respondents lies in the length of faculty and student terms. A faculty member theorized,

Faculty should be appointed for a longer term of office. They could serve a three-year term just like the public members do. In this way their effectiveness would be greatly improved. By the time faculty and students are oriented to the job, the year is almost over. It also takes time to establish one’s credibility.

But if this is a matter of concern for faculty where provisions exist for the renewal of appointments, how much more critical must this be for students. In most instances, boards lose their student members during the summer months. But, again, respondents favoured institutional memberships, even with their shortcomings.

About half of the public and student members were satisfied with the number of institutional members; only one-fourth of the faculty expressed

similar satisfaction (Table 3). Some public and faculty members felt that the number of faculty members should be increased, and some respondents from each group favoured an increase in the number of student members. Reasons offered for increased institutional representation related to concerns for parity and effectiveness. The latter was raised particularly with respect to increased student representation. A public member surmised that a student might not have the level of personal confidence of other board members, and so it might be wise to have two student representatives "so that they could provide moral support for each other." Perhaps how effectively a student member serves on a board depends not only on the student member, but also on the other members of the board and their willingness to work together for the common good of the institution.

All of the faculty and students and a majority of the public members interviewed were satisfied with the procedures used in selecting institutional members to college boards (Table 3). Public members were largely content to allow faculty and students to "pick their own" representatives.

In each of the six colleges, the faculty elected their representative to the board of trustees. Procedures varied from formal written nomination papers, with a mover and a seconder, posted about a week before ballots were cast to a nomination from the floor without a selection committee and a secret ballot that took place immediately. Although procedures varied, the main concern in conducting faculty elections was that "the faculty certainly has a chance to select whomever they wish."

Procedures for selecting student representatives for board membership during the time of this study were of three types: ex officio, by appointment and by election. Two student body presidents served as members of their college boards. The advantages in this arrangement, according to these respondents, lay in an increased measure of their effectiveness as campus spokesmen. "I'm more well informed about what is happening. I get a clearer picture on how each part relates to each other," offered one student body president.

Student representatives were appointed by student council at two colleges, and elected by the total student body at the other two colleges. Opinions differed regarding which was the best way to select a student representative. "In my opinion," asserted a student member, "an election is essential." Another added, "The election system at least identifies in the minds of some of the students who is the Board of Governors' representative." In opposition to elections, an appointed member propounded, "In the big colleges . . . you get about three kids running for a position, and most of the kids don't know whom they're voting for." And, commonly, only a fraction of the students were reported to participate in elections. Of course, for some, board membership was viewed as a political process, and these appreciated the opportunity "to go through the electoral system and sweat it out."

The Alberta experience with institutional membership on college boards has been a good one, at least from the perspective of new board members. While selection procedures differ somewhat among the institutions, faculty and students seem to regard their memberships seriously and are generally intent on finding the best possible representatives to serve on boards.

6. *What opinions do you hold of the college president's membership on the board?* By legislation, Alberta college presidents serve as voting members on their governing boards. Opinions on this matter were solicited only during the latter part of the study and, consequently, the findings may be less definitive. At best they may identify concerns that deserve further exploration.

Only a few respondents favoured presidential membership on college boards (Table 3). A faculty member felt this arrangement forced the president to clarify his position on agenda items. Another faculty member felt that the arrangement seemed to be working "fairly well," but added, "it may be different with a different president." Even these favourable opinions were not very positive in their support of voting membership for the college president.

Five of the seven public members who commented on this matter were opposed to presidential membership on governing boards. Generally, opposition was on a "theoretical" rather than a "practical" basis. And, clearly, it was not regarded as "a personal thing." It was questioned whether or not it was "healthy" for the president to actually have a vote with respect to his own decisions and actions. "If he is a true agent of the board," queried a student member, "then why is he allowed a vote on the board?" This position was further propounded by a faculty respondent:

As the president, he should be the person who implements and executes the policy decisions of the board and, to that end, he should be present as a resource person, and keep the board informed on a number of things that they may be doing contrary to the Act or past policies. But he should not be a voting member because of the repercussions that this tends to have.

In simple words, a number of respondents saw a "conflict of interest" in the president's board membership.

No one questioned the importance of the president's participation in board meetings. There was considerable concern, however, about the nature of the president's participation. Indeed, one public respondent expressed alarm over the president's ability to "sway a board." When that occurs, she complained, "I feel that what happens to you is that you become nothing more or less than a rubber stamp."

Concerns over this issue should challenge presidents to develop adept skills in exercising their board membership responsibilities. Indeed, opinions regarding presidential membership on governing boards call into question the basis for such a provision.

7. *How do you feel about the selection of the chairperson of the board?* Under present legislation, a board chairperson serves a three-year term by government appointment. Only public members were asked to express their feelings about the selection procedures involved. All but three of the persons who responded to this question, as shown in Table 3, expressed dissatisfaction with present arrangements.

One argument for retaining the present procedures was advanced in the interest of maintaining good relations with government. "If a board appointed its own chairman," surmised a respondent, "you might get some friction between the chairman here and the government, and I think that would be undesirable."

The majority of public members felt that the board should be either consulted prior to the selection or given sole responsibility for making the selection. Some thought that board members should be asked to "suggest somebody," or at least help the Minister in "screening" candidates for the position.

A number of board members argued that it would be "more democratic to have the board choose its own chairman." Furthermore, offered a public member, "We are the people that are going to know whether that guy is going to be able to handle the chairmanship or not." And finally, another confided, "If the people you're working with think enough of you to elect you chairman, then usually you are the best person available in that group." Presumably, no one would be appointed as chairperson without previous experience as a board member.

8. *In what ways might the selection of board members be improved?* Although many answers to previous questions contained implications for the improvement of selection procedures, respondents were given a specific opportunity to suggest changes that could improve the process. Whether proposed changes would actually improve the quality and effectiveness of boards must, of course, remain a matter of conjecture. The wide-ranging series of suggestions offered by respondents will be summarized in four categories related to matters of information, involvement, instrumentality, and institutional membership.

Information. An over-riding concern of respondents dealt with the general lack of information regarding the selection process. Most people were evidently quite ignorant about selection procedures. How persons are selected for board membership should be clarified.

Information should provide a general understanding of the procedures, but it also should set forth specific criteria for the screening and selection of board members. A faculty member proposed,

These criteria should be arrived at as a result of a careful examination as to what is going on at the college, [and] what the functions of the board are. Then various individuals should be judged against these criteria.

Making the criteria public would eliminate the nomination of persons who were obviously not qualified for board membership.

Board functioning also could be improved through a more intense orientation of newly-appointed board members. Some board members, criticized a faculty member, "are still fumbling as to the function of the board" after they've served for a year or two. And a systematic orientation program could be used to provide them with basic information about the college and the role of its governing board.

Involvement. A second set of suggestions related to the involvement of a wider spectrum of persons in the selection process. "Who makes the selection?" concerns itself not so much with legal provisions, but perhaps far more precisely with how the process functions. Many public members expressed frustration with their lack of involvement in the selection process. The nature of the proposed involvement ranged all the way from getting out into the community to "look for people who would be able to do a job in the education field for the college in this community" to interviewing and "screening" candidates for recommendation and for appointment. One

public member advocated involvement on the basis of the knowledgeability of board members:

We do know the people here in the community, and we do know the present board and the problems that are on the board, and what type of people you would like to see coming in. As certain people leave there are going to be certain gaps. . . . If certain names did go forward, we might say that one person might be more valuable on the board than another, from our point of view.

A faculty member, however, warned against the danger of board involvement: "They might be inclined to appoint a friend or an acquaintance who would only tend to perpetuate the same kind of thing. This could be a mistake."

Another proposal for greater involvement suggested the creation of a nonpolitical selection committee. A faculty member felt that a "formal selection committee" could "solicit the willingness of people to run." "Considerable time and effort should be spent in screening and selecting suitable candidates," advised a public member. Indeed, a faculty member suggested that at least three candidates should be interviewed for each position that was to be filled. Furthermore, another faculty member argued,

There must be people within the community with a certain adeptness in screening a large number of candidates. Certainly that could be done far more easily locally than by somebody that's in Edmonton.

The major concern in all of these suggestions appeared to be with finding a more effective way of identifying the best possible persons for board membership and, secondarily, to make the process at least appear to be more impartial by removing it from the "personal and political whims" of the Minister.

Instrumentality. Thirdly, respondents had suggestions regarding the instrumentality or logistics of the selection process. Perhaps the procedures were quite acceptable, but they just didn't seem to be functioning too well. Repeatedly, complaints were received about the long delays in making appointments. "If it's the system that creates this delay, then it's got to be faulted for that," judged a public appointee. In plain words, respondents viewed the process as having been "bogged down," and efforts should be made to announce new appointments well in advance of their effective dates.

Perhaps the resolution of the time-lag problem for institutional members comes from another proposal of a public member. Student and faculty representatives could serve "automatically" upon their selection. Why must their selection be "rubber-stamped" in Edmonton? Furthermore, it was proposed that students select their representatives in spring, perhaps April, so that they could participate more easily in board sessions during the summer.

Another functional matter related to the organization of the board. The majority of public members expressed dissatisfaction with present procedures, and recommended direct involvement in the selection of the board chairperson. It was also recommended that the board itself should establish policy regarding the term of office for the chairperson. Another public member regarding the present three-year term "a bit limiting" and

advocated the adoption of a rotational system for chairpersons within the board.

Institutional memberships. Finally, several respondents felt that changes with respect to institutional memberships could improve college boards. As noted earlier, a majority of public members and about half of the faculty and students who spoke to the issue of presidential memberships were opposed to it. Further consideration should be given to the effect of this provision on board functioning.

Members of all three constituent groups called attention to the number of institutional members on governing boards. It was suggested that an additional student member on the board, and perhaps also an additional faculty member, would increase the effectiveness of institutional members. The most "liberal" proposal came from a student who recommended "five students, five public members, and five faculty" constituting the board, and the president and his staff serving as resource people. A faculty recommended a "2-to-1" relationship of public members to institutional members. "Then, of course, when you have four lay members, you should have two faculty and two students."

The length of faculty and student terms also was raised for discussion. In the interest of providing continuity, a faculty member urged that the term be extended to at least two years. One faculty respondent argued for the retention of the one-year term on a renewable basis because, he maintained, this was a way of giving "a vote of confidence to the guy who was doing a good job." Others felt that the orientation to the position in itself warranted a longer term of office.

Conclusions

This article reviewed the procedures for selecting college board members in Alberta, and reported the perceptions of newly-appointed board members of the nomination and appointment procedures followed. Although the study was limited in scope, a number of major conclusions appear to be noteworthy.

1. College board members are drawn from an active sector of society, representing perhaps a somewhat limited cross-section of their communities.

2. Involvement in party politics prior to selection for trusteeship is common among public members.

3. Members are nominated by a variety of sources, although government involvement in the process seems to be quite substantial.

4. The selection procedures, and particularly the criteria followed, are unknown to the majority of newly-appointed trustees. Nevertheless, most respondents expressed satisfaction with present procedures used in the selection of public board members.

5. The provision for faculty and student membership on governing boards in Alberta is regarded very favourably by all respondents. If changes are to be considered, it should be in the direction of increasing the number of institutional members.

6. Most respondents were opposed to the provision of voting membership for college presidents on their boards.

7. Most public members expressed a desire to be directly involved in the selection of the board chairperson.

8. Major suggestions for improving the process were received in areas relating to the dissemination of specific information about selection procedures and criteria; the involvement of a wider spectrum of persons in the nomination and appointment procedures, particularly in an effort to remove the process from the personal and political whim of the Minister; increased efforts to speed up the instrumentality or functioning of the process; and a reallocation of institutional representation on boards.

Trustees devote a great deal of time and effort to their college responsibilities. The study reported in this article provides strong evidence of satisfaction with present selection procedures and offers some suggestions for improvement. Better selection procedures should result in a higher quality of board membership and, consequently, an improved environment for teaching and learning in Alberta's community colleges.

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2. Bevis Peters, a doctoral candidate in the administration of postsecondary education, prepared the initial content analysis of the interviews.

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J. McLEISH

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Knowledge and Revolution: The Student Movement in Tsarist Society (1856-1881)

The prototype of the student activist is found in the discussion circles which flourished in Tsarist Russia in the 19th century. These arose spontaneously in the universities of Moscow and St. Petersburg following the defeat of Napoleon (1812) and the execution of the Decembrists (1825). Not initially conspiratorial, these groups became so as a direct consequence of arbitrary police action.

The movement became a serious threat to the Tsarist System after the Crimean War. The revolutionary students organised to educate the illiterate peasants (about 80 percent of the population) with a view to inducting them into the social movement. Over two decades (1856-1873), the panacea of popular education was a leading motif of the movement for reform. The Sunday Schools and the movement "To the People!" were both inspired by the ideas of the London émigrés, Herzen and Ogaryov. The ruthless suppression of these activities by the Tsar drove the students to terrorism, resulting in the assassination of Alexander II in 1881. (Dr. McLeish is Chairman of the Division of Psychological Foundations, Faculty of Education, University of Victoria.)

The leading characteristic of Tsarist society, this "Kingdom of Darkness" (Dobrolyubov, 1859), was an almost total absence of human feeling. The barriers erected by social structure served to maintain individuals at a distance. The correct attitude to other people was a formality which concealed indifference. In a letter to a friend, Chekhov writes:

In this world it is essential to be indifferent. Only those who are indifferent are able to see things clearly, to be just and to work. Of course, I am only speaking of intelligent people of fine natures; the empty and selfish are indifferent enough anyway. (Quoted by Leites, 1953, p. 187)

The dangers of emotionality could be avoided by immersing oneself in paperwork. Official society under the Tsars lived by paper.

You sit in your office, no one confuses you, no one disturbs you. . . . A syllogistical

office activity gives me inexhaustible pleasure. One is drawn to it as to drinking or opium smoking. . . . If you think we have anything to do with these filthy scoundrels (the peasants) you are mistaken. There are secretaries and so on for that. (*ibid.*, p. 574)

The relations between official society and the universities during this period are well-conveyed in an anecdote of Professor Pavlov, the well-known liberal and the centre of progressive opinion in Kiev. In 1847, the University Chancellor, Governor-General Bibikov, declared:

Professors! You are free to meet amongst yourselves, but only to play cards. Students! Remember that I will turn an indulgent eye on dissipation. But a soldier's uniform is ready for anybody who indulges in freethinking. (Venturi, 1952, Vol. 1, p. 366)

Tsar Peter I introduced the sciences to Russia, especially those having to do with war. Initially supported by foreigners who had settled in Moscow, Peter was soon the centre of a wave of innovation. This was designed to further his ruthless drive towards imperialist expansion, described by foreign historians as the "Europeanisation process".

Peter's aims were imperialistic and militaristic: in pursuing them he was largely successful. But if Europeanisation means mass education (as in Prussia) or the development of peasant proprietorship (as in Germany and Switzerland) or the sponsoring of an independent, industrialised economy (as in England) Peter, and his successors, can be written off as totally ineffective. The limitations of his system of innovation "by Decree" can be illustrated from the field of education. The ukase of 1719 (Leary, 1919, p. 33) made literacy compulsory for the nobility, the clergy, and their children, this ability to be tested by examination. The illiterate were to lose certain privileges associated with their rank. Indeed, the final sanction was declassification and conscription into the army of life. Above a certain rank illiterates were forbidden to marry. But the problem of mass (peasant) illiteracy was not even raised by Peter—this fell into the area of private philanthropy. Autocracy willed the end of Europeanisation, but drew back from providing the means. Five years after the decree there were still only 110 elementary schools for a population of thirteen million (Chekhov, 1923, p. 22; Johnson, 1950).

Peter bequeathed the problem of controlling the process of change he had started to his successors. The question was: How to ensure that social and political changes are introduced gradually, by decree, "from above", and not sponsored "from below", in the manner of the rebel Pugachov? Reform as a government-sponsored monopoly, or revolution as an activity of the private entrepreneur—this was the question.

Tsarist Society in the Nineteenth Century

The Ruling Powers—The Conservative Ideology

Tsarist society was meticulously graded according to social origin and, after Peter, bureaucratic function in the state service. The legal code set out in monumental detail the rights and duties of each grade. Class barriers were strengthened by minute definition of the obligations, the rights and mutual relations of each social class. There were about fifty grades in the civil service defined by function, by forms of address, by specifications of the

medals and distinctions open to incumbents at each grade. (*Bolshaya Sovetskaya Entsiklopediya*, 2nd ed., vol. 41, p. 447).

Women had very low status. For example, the husband had the right, given by an early lawgiver, to chastise his wife, provided he used a cane not thicker than the middle finger. Under Nicholas the First, barbarous physical punishments were meted out, especially to state criminals (Masaryk, 1919). Castigation with the knout, flogging in the Army and in prison, running the gauntlet, branding on the face, forced marches from Moscow or Saint Petersburg to Siberian exile—"a yawning abyss of all possible horrors" in the words of an official investigation by Baron Korff in 1844 (Wallace, 1912, p. 584)—these were common civil and military sanctions.

In the case of political offenders, public execution by hanging or shooting; solitary confinement lasting twenty, thirty or forty years; civil execution (a grotesque simulation of the real thing); hard labour in the mines; exile to Siberia—these were still common punishments.

In cases of treason the Tsar would personally interrogate the accused, he would prescribe the sentence. He behaved literally as "the Father of his people," especially when punishment had to be prescribed.

The ruling class was an authoritarian, father-identifying group. The pattern of punitiveness, authoritarianism, male chauvinism, emphasis on status differences and hereditary privilege—these persisted throughout the 19th century. In addition to fatherworship, the bureaucracy was devoted to militarism as a way of life. In performing their official function everyone wore military uniforms designed by the Tsar himself. Students and professors were not exempt. Some slept on camp beds in imitation of the Emperor.

The ideal of the Russian monarchy was summed up by Uvarov in 1837 in the slogan: *Autocracy, Orthodoxy and Nationalness*. This political, religious, and cultural ideal proved more and more inadequate as new needs were fostered by contacts with Western Europe. The State routines and value-system diverged more and more from the standards accepted by the educated classes. The ideas of the older generation were totally unacceptable to the young intelligentsia. The economic system proved more and more inadequate. A stagnant agricultural system could not meet the basic needs of an expanding population. A radical transformation was clearly necessary to provide the primary necessities of life for the masses of the people (Lyashchenko, 1956). Serfdom was an obsolescent social and economic system a century before it was abolished.

According to Lenin, *the production of grain for sale* was the signal for the collapse of the whole system of feudal agriculture (Lenin, 1957). The abolition of the Corn Laws in England in 1846 was the economic catalyst which accelerated the development of capitalism in industry and in agriculture. The need of the new system of production set in train vast social and economic changes in Russia. The same economic forces which opened up the American West enormously stimulated the growth of capitalist relations to the Russian towns and countryside.

An ideology of change, based on objective needs, confronted an ideology of conservatism, based on vested interests. The ideologists of conservatism became more and more incapable of governing in the old way. They proved

unable, and unwilling, to learn new ways. They become "superfluous men."

At the appropriate moment they were discarded, leaving behind nothing but their illusions and woeful heritage of rigid bureaucracy.

*The Peasants before and after Emancipation (1861)—
The Revolutionary Situation*

The peasant remained the main hope of the revolutionaries until the end of the nineteenth century. However, the peasantry showed a total lack of comprehension of the motives of the revolutionaries. It was an unwritten law that no peasant would ever appeal to the authorities against another peasant. But criticism of the "Little White Father" by the urban intellectual, trying to pass himself off as a peasant, was so disturbing that the normal outcome of the encounter (as in the movement "To the People!" of 1873) was police action, instigated by the peasantry. The peasants often took the law into their own hands and drove the educator-revolutionary from the village with blows (Meijer, 1955).

The folk tales (byliny) which centre around the mythical Ilya Muromyets have often been taken as a characterisation of the Russian muzhik (Ralston, 1872). They have as motif certain cyclical sequences which were said to characterize peasant behaviour. There is an alternation of jollity and melancholia, of absolute inaction and feverish bursts of activity, of fasting followed by feasting, long periods of repentant sobriety alternate with orgies of drunkenness, uncontrolled fits of physical violence and aggression are followed by tender care tinged with remorse, an insatiable curiosity is suddenly replaced by a doctrinaire censorship of expression, moods of passivity and fatalism supervene on a superabundant, indeed limitless, optimism about the capabilities of mankind, an untidiness and lack of system is punctuated by intermittent aspirations towards "kulturnost" (delicacy and fastidiousness) (Wallace, 1912).

It was exactly this unpredictability and resort to violence, coupled with their vast numbers, which persuaded the Russian revolutionary that the peasantry represented that primeval, ubiquitous force which alone could topple the Tsarist regime.

On 19 February 1861, the long-awaited manifesto liberating the serfs was published. The liberal opposition to the Tsar crumbled in face of this recognition of their demands. Other groups—the revolutionaries, the peasants, the student circles—did not take this view at all. When the provisions relating to compensation of the owners were clear, numerous disturbances in the shape of riots, jacqueries, murder of proprietors took place. There was a general administrative breakdown. In 1861 there were over 279 outbreaks, many on a scale which revived memories of Pugachov. For example, the Bezdna disturbance involved over five thousand peasants and two hundred and thirty soldiers. The outcome was fifty-one dead and seventy-seven wounded (Venturi, 1952, chapter 7). The commotion was due to the fact that the illiterate peasants accepted the fantasies of a semi-literate peasant as a translation of the Decree. The village priest, who was responsible for reading and explaining the Decree, was often semi-literate or even quite illiterate.

Following Emancipation, *obrok* (quit-rent) and *barshchina* (forced

labour) remained in force. Indeed, these became more burdensome. The landlords were compensated for the land which they sold to the peasants at inflated prices. In addition, the peasant had to pay an indemnity to his landlord for his freedom. Twenty million serfs emerged from Emancipation “free”, but indebted by mortgage for the rest of their lives (Lyashchenko, 1956, chapter 20).

Chernishevski predicted in 1857 that “nothing but abomination would result” from emancipation “from above”. He lived to see this prophecy realized. His *Letters without an Address* (a series of open letters on the results of Emancipation) were absolutely forbidden publication. Shortly afterwards he himself was arrested (7 July 1862) and convicted of criminal conspiracy.

The Tsar and his advisers were driven to Emancipation by the threat of revolution and by hard economic necessities. The classic statement of Marx about social change as the result of the productive *forces* maturing within the womb of the old society and being fettered by the productive *relations* (McLeish, 1968) is clearly exemplified in the social history of Russia. Emancipation was a prerequisite for industrial capitalism but the new system hardly improved the condition of the peasantry. In fact, they were worse off when feudalism was abolished. Many were crippled with redemption payments often five times higher than their real income (Venturi, 1952, Vol. 2, Chapter 7).

The Decree of 1861 was a compromise, in which everything was done to safeguard the landowners’ interest. They had wanted emancipation without land, only in that respect were their wishes disregarded.

Emancipation served to divide the liberals from the revolutionaries. The Autocracy seized its opportunity. Intransigent leaders, such as Chernishevski, were removed from the scene. The Sunday School movement for eliminating illiteracy was smashed by Imperial Decree (McLeish, 1974). The opposition forces were dispersed. Peasant revolts were put down to the sound of grapeshot and the screams of the peasants under the Cossack knout. The revolutionaries were driven underground. Many continued to work clandestinely for the overthrow of the regime. Perforce they were driven to terrorism. Any other activity was only marginally open to them. This was increasingly so after the failure of the Movement “To the People” of 1864-1873. The primary objective of civilizing the peasant was replaced by an “act of faith” in anarchist terrorism — that is, an appeal to the destructive “instincts” of the masses by presenting a model which would call forth their spontaneous response (Carr, 1937).

The Student Movement

The earliest student groups originated in the 1830s as discussion circles. Between the end of the Crimean War (1856) and the *Manifesto of Liberation* (1861) many secret, illegal, sometimes revolutionary groups, sprang up at the Universities of Moscow, Kiev, and Saint Petersburg. These circles made contact through certain key figures (Pavlov, Bekman, Muravski, and others). On the basis of forbidden materials produced by Herzen in London, they worked out a common core of ideas, aspirations and techniques. The groups sprang up for no apparent reason; they flourished for a time, then

they disappeared without trace. Individual students provided continuity. Utopian programmes were elaborated and various alternatives were debated about how to achieve the ideal commonwealth.

One of the earliest was a group of Moscow students who called themselves the *Vertepniki*, the “cavemen” or “troglodytes” (Venturi, 1952). They met regularly with other young men — army officers and office workers — to discuss the burning questions of socialism, republicanism, and the social life of the Russian commune. Like most of these circles, they believed, with Herzen and Ogaryov representative of the repentant nobles, that the intellectual classes owed some kind of social debt to the peasantry. The circle discussed and prepared for an approach to the people as early as 1855. The “cavemen” were untypical only insofar as they belonged to the lower social classes. Several had family links with the religious schismatics (Raskolniki). Under the Tsar, dissenters were persecuted, placed under police surveillance and often outlawed. As a result, they provided fertile soil for revolutionary ideas (Brower, 1975).

According to a police report of 1858, the Moscow student group consisted entirely of ardent republicans, with a similar group of conspirators in the University of Kharkov. This group had passed from the state of abstract debate to the discussion of methods of abolishing the Autocracy. Already, they had a plan to organise and indoctrinate the peasant masses with revolutionary ideas. (Venturi, 1952).

The Kharkov circle formed immediately after the Crimean War. The founders were two students, Bekman and Muravski from Kiev, members of the lower nobility (Pichkurenko, 1954). The defeat of Russia in the Crimean War had been the occasion which led to the conspiracy. These students predicted that a complete overturn of Russian society was the only way to redeem the past and ensure a brighter future. With two other students, Yefimenko and Zavadski, members of the *raznochintsy* (“commoners” or “those outside the official ranks”), Bekman and Muravski constituted the nucleus of the group. By the end of 1856 they had recruited eight members.

At this point the group coalesced with the Paskvilny Komitet (“committee of slanderers”). There were five students in this group, all from the upper nobility. They were animated by the ideals, later caricatured by Turgeniev in the character of the “nihilist” Bazarov, in the novel *Fathers and Children*. They dismissed all conventional beliefs, customs and ideas as obsolete. They claimed to believe in nothing, hence the label of “nihilism”. Like Bazarov, they combined this hostility to tradition with a single-minded devotion to “exact science.” This circle had one simple and clear aim—total revolution, which must begin with the abolition of serfdom:

We believed that Russia would arise that very year. All we needed to do was to publish a few thousand copies of some sort of manifesto and send our agents everywhere with it. If these plans were carried out we expected that one fine morning people would waken up to find a bloody revolution had broken out all over Russia. (Koz'min, 1930)

These fantasies were based on the palpable discontent of all classes. It was widely believed, even in official circles, that a peasant revolution was just around the corner. Many (following Bakunin) believed that this would occur “spontaneously”, the peasantry taking up their axes, reacting to

generations of injustice, frustration and oppression. On the other hand, the Kharkov circle believed that a necessary condition for revolution was the dissemination of revolutionary ideas by education and the printed word. They believed that the peasants represented the only social class with the necessary potential of revolutionary energy; in asking how to harness this energy, the Kharkov circle immediately confronted the problem of mass illiteracy and the means of overcoming it (McLeish, 1974).

The conditions of this period are those revealed in 1897, when the first national census discovered an illiteracy rate of 78.9%, reaching more than 90% in the countryside. In the total population of 125,680,682 only 25,569,585 could read. Most of the twenty-five million literates (which could signify merely the ability to write one's name) were relatively young; they were males; and they lived in the towns in the Polish provinces or in Great Russia. Of nearly 23 million children of school age only a quarter were literate (Ivanovich, 1906, 38-55). Even this degree of literacy represented decades of devoted work by liberal educators who had to combat strong government and Church interference. The treatment meted out to Count Leo Tolstoy and his school at Yasnaya Polyana is typical of the obscurantist attitudes to education which prevailed in official circles.

The Kharkov and Kiev groups coalesced on the basis of a common programme. Their ideas were derived from Herzen and his *Free Russian Press* in London. Under the influence of Herzen and the progressive history professor Platon Pavlov who visited Herzen abroad, they became republicans. The group made plans for the subversion of the Kiev garrison and for propaganda in the villages. However, their only successful activity was the distribution of a manifesto about the intolerable condition of Russian society revealed by the war in the Crimea.

The growing realisation of the overwhelming difficulties of organising a revolution caused the disruption of the group. According to Zavadski, the circle degenerated into gossiping factions. It was saved from total disintegration only by Bekman and Muravski who established a link with the Kiev circle in 1858. This circle was organised around Professor Pavlov of Kiev. On a visit to Herzen in London, he had picked up the idea of the Sunday School and of involving the peasants in the social movement by combining literacy education with revolutionary ideas (McLeish, 1974 and refs.).

The five students (later groups used five-member units as the basic "cell" of the conspiratorial network) Bekman, Muravski, Yefimenko, Portugalov, and Zavadski became itinerant evangelists of revolution at this point. They set up circles of helpers and sympathisers. These organized schools, lectures, libraries, and discussion circles. Other students and intellectuals not directly revolutionaries followed suit in setting up Sunday Schools. These were often used as centres of revolutionary propaganda (Abramov, 1900). More than 2,000 teachers were thus recruited. Between 1859 and 1862 more than 300 schools were created through local initiative. Liberal democrats and revolutionaries united in the common task (Pichkurenko, 1954). The government, seizing the excuse of the fires in St. Petersburg in May 1862 (claimed to be a signal for revolution), closed down all schools for illiterates and all reading rooms in the Empire and the Army (Kropotkin, 1899).

Subsequently, participants in the literacy movement were sentenced to exile, birching, loss of civil rights, and in one case "civil execution" followed by forty years imprisonment in a fortress (Pichkurenko, 1954, pp. 113-114).

The Sunday Schools were revived in the early 1870s and operated clandestinely in towns and villages. In 1873 there was the great educational movement "To the People" (*V narod*). Thousands of students, intellectuals, and revolutionaries left their homes, their studies, their occupations to go into the Russian countryside to teach the peasants about modern science, constitutional government, hygiene, and revolution. It was a mass movement of desperate protest, undertaken in a condition of euphoric enthusiasm. Like the Children's Crusade, to which it bore many analogues, the movement failed completely. Apathy and ignorance caused the village population to respond by driving the educators from the villages. Sometimes they informed the police, sometimes they simply boycotted these alien intruders. The only result of the movement was that many of the would-be educators were exiled or imprisoned.

The apathy of the peasants as a class was about equal to that of the liberals. Their political and social demands were limited in character. They were largely met in the economic consequences of Emancipation. The unremitting pressure of the Tsarist police after 1873, the effects of the fanatical adventurism of Nechayev on the revolutionary movement, the debacle of the *V narod* policies, had their effect. Students decided that academic discussion and propaganda were luxuries they could ill afford if they involved payment by one's life, or a lifetime in a Tsarist dungeon (Lemke, 1908, 1923). The lack of response to the demands for constitutional reform, the success of police *agents-provateurs* in permeating and destroying the revolutionary groups, called forth a spirit of frustrated retaliation (Deacon, 1972, Chaps. 5-7).

These factors created a social vacuum where the violence of the state machine could be countered only by the violence of the terrorist. The revolutionaries, as they explained in proclamations after the assassination of Alexander II (Footman, 1944; Venturi, 1952) were driven to terrorism, in spite of their wishes. The consequences of the assassination of 1 March 1881 (or the lack of consequences) demonstrated the nature of the blind alley into which they had been driven. This blind alley was the terminus of the path they had taken under coercion of the political apathy of "the general will."

From Student to Professional Revolutionary

In the revolutionary movement we can see a clear development. Initially the impetus is provided by adolescent romanticism and adventurism. The reaction from established authority forces a more realistic and scientific outlook on the movement. Control passes to the dedicated professional. Usually this individual is a victim of judicial persecution who develops a sublime faith in the outcome of the struggle and of his ability to bear with fortitude the extreme punishments the enemy has in store, or of his chances of avoiding them. A process of selection is at work: It is a matter of the "Survival of the fittest." Only the disciplined, organized, and dedicated revolutionary can hope to survive for more than eighteen months in the struggle against the secret police. This was the average "life-expectancy" in

the revolutionary movement. Chernishevski's fictional character Rakmetov, the hero of "What is To Be Done?" became the revolutionary ideal, a model for such as Vladimir Ilyitch Ulyanov (Lenin) three decades later. This hero is described by Nechaev:

The revolutionary is a dedicated man. He has no personal interests, no personal business, no sentiments, no attachments, no property, not even a name. Everything in him is absorbed by one single exclusive interest, one single thought, one single passion: the revolution. (Carr, 1937, Chap. 28)

The revolutionary was disgusted with Russian life and Russian conditions. His favourite characterisation of Tsarist society was as a graveyard. In his famous letter to Michelet, published in 1851, Herzen refers to Russia as "the deception, the pestilence".

This Russia extends from the Emperor, passing from gendarme to gendarme, from official to official, down to the lowest policeman in the remotest corner of the Empire . . . This living pyramid of crimes, abuses and bribery . . . is held together by a community of interest in plunder and gain, and supported on six hundred thousand animated machines with bayonets. (Herzen, 1927, Vol. 6, p. 236)

This description could be paralleled many times over from the works of the "Westernisers" Byelinski, Chernishevski, Mikhailov, Lavrov.

Rejection and hatred of the Tsar and the ruling class preceded any rational analysis of actual social conditions. The leading motif in political discussion is the question: "What force is there in Russia which can be counterposed to this utterly disgusting regime?" The intellectual, often a scion of the minor nobility, actually wanted to *become* a peasant or industrial worker, to devote his life to elevating the lower classes by educational or political means. Ogaryov is the prototype of this "repentant noble" (Carr, 1949). The denial of class origin was the main basis of the Student Movement of 1873—"To the People!" The comment of Rostopchin on the Decembrists, that it was the first time a revolution had been planned by gentlemen who wanted to become cobblers, was much more apposite in 1873 than it was in 1825.

The Value System and Activities of the Student Revolutionaries

The theme of regeneration is fundamental: Revolutionaries agree that "Mother Russia" must be saved by the action of the millions of peasants. Regeneration can be effected only by destruction of the hated "White Father." It is not difficult to find an Oedipus theme in the writings and speech of the revolutionaries. There is a common desire, a religious wish, for internal peace, to be achieved by the return to some primeval Arcadia. The Paradise, lost by the design of wicked men, can be regained only at the expense of much blood and suffering. Some think of this Paradise as the Russian village, the commune, cleansed of the filth and disorder of centuries of malevolent intervention by alien intruders ("the Byzantine-German government"). Everything will be in common: All the needs will be fulfilled. Others see a Utopia emerging on the basis of industrial life, founded on science. Shchapov is a representative of this trend:

At all times and places ignorance of the laws of nature has produced only slaves; slaves of nature herself and of human force, of the force of muscle, brain and intelligence, of the force of deceit and prestige, wealth, power, despotism. (Shchapov, 1906-1908, Vol. 2, p. 170)

The seven stages characteristic of social change described by Parsons and Smelser can be easily recognised in the history of the Russian revolutionary movement (Smelser, 1959; Parsons & Smelser, 1957). Throughout the forties, fifties, and sixties, revolutionaries sought to add to the store of viable techniques and ideas. There were many changes in emphasis in thinking about the mechanics and anticipated progress of the revolution. These modifications and additions to revolutionary thought represent two stages in the learning process, proliferation of new ideas and attempts to specify the correct solution (Smelser, 1959, pp. 252-261). A few illustrations of these new ideas include: Serf emancipation; recruitment of dissenters to the revolutionary party; revolutionary terror (assassination, banditry); the effective organization of revolutionary groups; propaganda; a continuing process of education of the people in scientific knowledge; day-to-day agitation; literacy education and the saturating of it with revolutionary ideas; struggle for a constitution by legal means; each of these was proposed as a political panacea (Venturi, 1952).

The measures adopted by government represent marked symptoms of disturbance. In turn, these measures gave rise to disturbance in the opposition groups. These symptoms took the form of anxiety, violence, Utopian fantasies, neurosis, even insanity.

The numerous attempts to apply the method of choice resulted invariably in failure. Some of the most notable failures were: the assassination of Alexander II; the movement of liberalise the universities by direct action; the liberation from serfdom; the Russian Sunday Schools; the organization of trade unions and political parties.

The methods by the Autocracy to control innovation were highly successful. These were: exile to a distant province; civil execution; imprisonment for long periods, with hard labour and solitary confinement; a formal declaration by the Tsar that the innovator was insane; the use of *agents-provocateurs* by the Third Section; censorship of all published materials; the setting of one section of the radical intelligentsia against the other; general techniques of social disapprobation.

The effect of these measures was to slow down drastically the process of innovation. The sequence was: dissatisfaction gave rise to disturbance; disturbance in the system produced attempts at handling. In turn, the handling of symptoms showed the need for new ideas. Numerous attempts to specify then ensued. These different specifications were then tried. It is a matter of history that these trials invariably failed. This was the normal sequence of causal relationships (McLeish, 1968, pp. 65-66). The net outcome was that attempts to introduce a new order invariably broke down. Because of this abortive pattern, the spirit of innovation languished in Russia from 1790 to 1917. There were, of course, numerous social changes during this period, many extremely radical in nature. As examples, we may instance the emancipation of the serfs; the establishment of large concentrations of industry supported by foreign capital; Imperialist expansion, including the conquest of the Ukraine, Poland, the Caucasus, Armenia, Lithuania and Siberia — the mobilization of the population for the defeat of Napoleon; the debacle of the Crimean, then the Japanese war; the concentration of enormous debts to foreign money-lenders; the establishment of a State

Duma. The Russia of Nicholas II was not the same as that of Peter. But change was localized in particular sections of the economy and of the social system. The structure itself and the mass of the population were hardly affected.

The history of social change in Russia can be conceptualized therefore as a cyclical process with the process being pushed back repeatedly, the lost ground being regained by each generation of revolutionaries who rapidly recapitulated earlier stages. More concretely, there were a number of abortive attempts at change based on recurrent dissatisfaction with role-performance and with the use of material resources. This dissatisfaction arises afresh in each generation, due to the frustration of the needs of individuals and of defined groups. Building on the experience of their predecessors, each generation attempts to abbreviate the process of change so as to produce a successful outcome. They seek to begin from the point reached in previous sequences, to assimilate the heritage of revolutionary ideas as quickly as possible. The paradigm of trial and error learning can be used to explain social innovation in this case. Social change is a continuous process of adaptation to the exigencies of the environment.

The last two stages of innovation, namely, trial and success, followed by routinisation, appear only during the Soviet period.

The Social Function of the Revolutionary Movement

Speaking broadly, the Russian revolutionary movement served as the channel of communication between the most radical thinkers of Western Europe and the traditional culture of Tsarist Russia. It gave clear, if doctrinaire, expression to the needs and aspirations of certain classes or groups, in particular, the peasants, the sects, the Jews, the industrial workers. These groups had no possibility otherwise of communicating their sufferings, their hopes, their ideals except through passive resistance, or by unpredictable violence.

The intellectuals, active in the revolutionary movement, provided a voice for all the oppressed classes who had no influence on the course of events. They gave general expression, often in a language incomprehensible to their "constituents," to the need for change. Objectively speaking, they operated as a mediating influence to civilize the protest of the oppressed. In their absence, the reaction to oppression might otherwise have been Pugachovshchina—the murder of proprietors, the maiming of cattle, the burning of manors and manorial records, the flight from the village of whole populations, banditry. The revolutionary movement, appearing superficially to be a conflict phenomenon, performed a role useful to the established powers as well as to society as a whole.

It may seem paradoxical, but it is nevertheless true, that the Tsarist autocracy co-operated with the movement in a number of ways. This fails to be recognized, because in form this co-operation appeared as conflict. But by censoring writings, instead of totally suppressing them, official society was providing the revolutionaries with a licence to publish. The Tsarist police helped in a great number of ways to organize and "supervise" the work of the revolutionaries. We may instance Moscow police-chief Zubatov's labours in helping to organize the trade union movement. The secret police who

actively worked in the movement, through their reports, channelled ideas through to the Emperor himself. This meant that administrative decisions would normally take some account of the views of the clandestine as well as of the open publicist groups. The Emperor kept himself informed of the underground ideas by regularly reading the revolutionary newspapers produced by Herzen in London—he did not enquire too closely by what channels they arrived so promptly on his library table. At various times, particular sections of the revolutionary movement were encouraged at the expense of others. For example, Marxist groups were initially free to publish even the most radical views about society since their economic analyses and forecasts were in the form of a polemic against the Narodnik economists, then considered to be the most dangerous enemy of the established order. Later the “legal Marxists” were given similar support against the revolutionary wing. Certain Tsars, especially at the outset of their reigns, gave rise to expectations of reform. In this connection, a case could easily be made out for Peter the Great as the first pioneer of the revolutionary movement. Even the two Alexanders originally had philanthropic impulses.

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E . A . B L O W E R S

The University of Alberta

Prediction of Metropolitan Readiness Test Scores

Readiness tests are used widely in kindergarten and grade one as useful predictors of future school performance. In this study, the efficiency was examined of several visual and auditory predictors of the Metropolitan Readiness Tests. Subjects were 106 grade one children considered by their teachers to show learning difficulties. The stepwise multiple regression analysis of the data indicated that visual tasks were more efficient as predictors. It was suggested that the Metropolitan may be overly dependent on visual abilities and that some development of abilities considered as efficient predictors of readiness scores might be done in kindergarten programs. (Dr. Blowers is Assistant Professor in the Department of Educational Psychology, The University of Alberta.)

Readiness tests are used widely in kindergarten and grade one classes to determine the general aptitude of young children for academic learning. One of the better known readiness tests is the Metropolitan (Hildreth & Griffiths, 1955) which is administered to all grade one pupils throughout cities such as Washington (Blackmore, 1973) and Edmonton (Edmonton Public School Board, 1975). *The Seventh Mental Measurements Yearbook* (Buros, 1972) describes the Metropolitan as an appropriate predictor of early formal learning. In summary, the Metropolitan Readiness Tests are used widely and are regarded as effective in predicting early school learning. This study examines the question of whether other types of tests commonly used with preschool and grade one children may be useful in predicting scores on the Metropolitan Readiness Tests.

Method

Fifty female and 56 male subjects ranging in age from 67 to 78 months and attending normal grade one classes in the public school system of a

large Canadian urban centre were selected by their teachers as possibly experiencing learning difficulties. While it is not possible to judge how representative the group selected was of all grade one pupils with learning problems, all teachers who were asked to take part in the study identified one or more of their pupils as appropriate for the study. The subjects in the

TABLE 1
INSTRUMENTS USED IN THE STUDY

Category	Test	Subtest	Content	Method of Presentation	Method of Response
Readiness	Metropolitan	Word Meaning	Relating words to pictures	Auditory	Visual-motor, marking appropriate line drawing
		Listening	Relating sentence/paragraph to pictures	Auditory	Visual-motor, as above
		Matching	Locating shape/design/word identical to stimulus	Visual	Visual-motor, as above
		Alphabet	Selection of letter named	Auditory	Visual motor, marking appropriate letter
		Numbers	Range of pre-arithmetic and early arithmetic skills including comparison, counting basic number operations	Auditory	Visual-motor, as in Word Meaning
		Copying	Copying shapes/designs/letters	Visual	Visual-Motor
Auditory	Goldman-Fristoe-Woodcock Discrimination	Silent	Discrimination of acoustically similar speech sounds	Auditory-from tape recording	Visual-motor, selection of appropriate picture
	Detroit Tests of Learning Aptitude	Related Syllables	Meaningful auditory memory for sentences	Auditory-from tape recording	Auditory-Vocal subject repeats sentence
	Peabody Picture Vocabulary Test		Receptive vocabulary-relating words to pictures	Auditory	Visual-selection of appropriate drawings
	Illinois Test of Psycho-linguistic Abilities	Sequential	Nonmeaningful auditory memory for digits	Auditory	Auditory-vocal
		Auditory Closure	Recognition of partially heard words	Auditory	Auditory-vocal
		Sound Blending	Combining speech sounds to form words	Auditory	Auditory-vocal
Visual	Illinois Test of Psycho-linguistic Abilities	Visual Memory	Recall and reproduction in sequence of nonmeaningful visual stimuli	Visual	Visual-motor
		Visual Closure	Recognition of partially visible stimuli	Visual	Visual-motor
	Frostig Developmental Test of Visual Perception	Eye-motor coordination	Construction of relatively straight lines between two points	Auditory and visual	Visual-motor
		Figure-ground Discrimination	Outlining overlapping and/or obscured figures	Primarily visual	Visual-motor
		Form constancy	Recall and discrimination of common shapes	Auditory and visual	Visual-motor
		Position in space	Shape matching by fine directional cues	Visual	Visual-motor
		Spatial Relations	Copying marble board designs on opposite side of page to which presented	Visual	Visual-motor

study, therefore, represented a group of pupils considered by their teachers to be displaying some difficulty in mastering grade one academic work.

All subjects received the Wechsler Intelligence Test for Children (Wechsler, 1955) and ranged in full scale scores from 69 to 131, with a mean score of 102. The socioeconomic backgrounds of the families ranged from 29 to 76 on the Blishen Occupational Class Scale (1958).

Predictor variables used in the study are in relatively common use with kindergarten and grade one children and included parts of the Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy & Kirk, 1968), the Frostig Developmental Test of Visual Reception (Frostig, Lefever & Whittlesey, 1963), the Peabody Picture Vocabulary Test (Dunn, 1959), the Goldman-Fristoe-Woodcock Test of Auditory Discrimination (1970) and the Memory for Related Syllables subtest of the Detroit Tests of Learning Aptitude (Baker & Leland, 1959). The predictor variables were classified as primarily auditory or primarily visual. Auditory predictors included measures of abilities involved in discrimination, receptive vocabulary, meaningful and nonmeaningful sequential memory, closure and sound blending. Visual predictors included measures of abilities involved in sequential memory, closure, eye-motor coordination, outlining obscure and overlapping figures, shape discrimination, shape matching by directional cues and reproducing pictured marble board type designs.

Predictor variables were classified as primarily auditory or primarily visual in relation to the content of the test or subtest. At the same time, the presentation of the material and the response required of the subject might be primarily auditory, primarily visual or some combination of these. To take one example, the Word Meaning subtest of the Metropolitan is presented orally and the subject is required to select a picture that illustrates the word by marking the picture. This indicates that the Word Meaning subtest is a relatively complex task involving auditory vocabulary and memory as well as visual discrimination and some level of visual motor ability. In general, many of the tests used tended to draw upon a variety of abilities. The instruments used in this study are described in Table 1 by title, content, and methods of presentation and response.

The statistical analysis was designed to identify those variables best predicting subtest and total Metropolitan scores. Stepwise multiple regression analysis was used to determine which combinations of predictors were most efficient in predicting readiness test scores (Ferguson, 1971). In making the stepwise multiple regression analysis, all predictor variables were included to determine which were most efficient in predicting the criteria variables. Predictors at a probability level of .05 or less were considered relatively efficient.

Results and Discussion

A summary of significant predictors at the .05 level of significance, with the next most efficient predictor above the .05 level, is given in Table 2.

The level of prediction of the subjects of the Metropolitan Readiness Test varied from approximately 54% in Numbers to only 27% in Listening. Seventy percent of the variability in the total score was accounted for by variability in four of the predictors. At the probability level of .05 or less,

TABLE 2
STEPWISE MULTIPLE REGRESSION ANALYSIS PREDICTION OF
METROPOLITAN READINESS TEST SCORES

Criterion Variable	Predictor Variable	F	Probability	Cumulative % of Variance
Word Meaning	Receptive Vocabulary	38.43	0.00	26.98
	Meaning Auditory Memory	9.68	0.00	33.26
	Eye-motor Coordination	3.40	0.07	35.45
Listening	Marble Board Type Designs	23.55	0.00	18.46
	Receptive Vocabulary	11.47	0.00	26.63
	Auditory Discrimination	3.42	0.07	29.01
Matching	Marble Board Type Designs	27.17	0.00	20.71
	Shape Matching	4.92	0.03	24.33
	Shape Discrimination	2.44	0.12	28.87
Alphabet	Marble Board Type Designs	36.64	0.00	20.05
	Receptive Vocabulary	7.99	0.01	31.38
	Nonmeaningful Auditory Memory	5.12	0.03	34.66
	Shape Discrimination	3.26	0.07	36.70
Numbers	Marble Board Type Designs	55.81	0.00	34.92
	Meaningful Auditory Memory	27.88	0.00	48.79
	Receptive Vocabulary	6.27	0.01	51.75
	Shape Matching	4.70	0.03	53.89
	Auditory Closure	2.90	0.09	57.51
Copying	Marble Board Type Designs	38.44	0.00	26.99
	Shape Discrimination	7.67	0.01	32.05
	Eye-motor Coordination	5.35	0.02	35.43
	Receptive Vocabulary	3.73	0.06	37.73
Total Scores	Marble Board Type Designs	44.02	0.00	47.48
	Receptive Vocabulary	41.80	0.00	62.64
	Shape Discrimination	17.18	0.00	68.03
	Meaningful Auditory Memory	8.94	0.00	70.63
	Auditory Closure	3.32	0.07	71.57

auditory instruments were most effective in predicting only Word Meaning, while visual instruments were most effective in predicting Matching and Copying. The single best predictor of most of the Metropolitan subtest scores and of the total scores was the Marble Board Type Designs, subtest five of the Frostig Developmental Test of Visual Perception, which appears to depend upon visual-motor abilities both in presentation and response (Table 1). The subtests of Copying and Matching appear to depend primarily on visual-motor abilities but the best single predictor of the Listening subtest also was Marble Board Designs. All subtests on the Metropolitan require interpretation of symbolic visual material, which may explain in part why visual and visual-motor abilities appear to influence the scores on this test. It is possible that the Metropolitan Readiness Test is less useful than it might be in predicting academic learning because of this limited influence of auditory abilities on scores. To take an example, a child with high visual but low auditory abilities might appear to have a spuriously high chance of success in early school activities, as his readiness test scores might be only minimally related to his problems.

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BOOK REVIEW

THE FORKED ROAD: CANADA 1939-57. By Donald B. Creighton. Toronto: McClelland and Stewart, 1976

In the Canadian Centenary Series of which he is also advisory editor, Donald Creighton, one of Canada's senior and most productive historians, has contributed in the *The Forked Road* a perceptive history of Canada covering the eighteen years from 1939 to 1957, years dominated nationally by Liberal governments successively under the leadership of the strange but politically astute Mackenzie King and the urbane, business-like but rather unimaginative Louis St. Laurent.

Having first recorded the entry of Canada into World War II, Creighton takes a cross-sectional look at us as we were in 1939: in politics, international relations and policies, technological and social development, religion, education, and the arts. Creighton's thesis, as suggested in the title of the book, is that Canada, having arrived at a point in her history where two roads to the future diverged, chose the one that "led directly into the new world of planning and management, of economic controls and social equalization." This new world was marked by a weakening of ties with Great Britain and the Commonwealth and by increased dependence on and cooperation with the United States. It was marked, too, by emphasis on the use of advanced technology in the development of both primary and secondary industries. Manufacturing began to flourish as never before; natural resources, including expanding sources of petro-chemical and electric energy, gave new direction and impetus to our physical and economic growth. All of this affected the demand for consumer goods, the general standard of living, and the increasing use of the means of communication and travel. To make these possible required bold, if sometimes questionable, decisions involving large amounts of capital secured, in increasingly large amounts, through foreign investment, international loans, and government spending.

In spite of Mackenzie King's efforts to prevent conscription and to limit Canada's contribution as much as possible to a training (e.g., Commonwealth Air Training Plan) and supply role, Canadians were proud of the achievement of their army, navy and air forces in various of the war zones. While she played a minor part in determining strategy and tactics related to the conduct of the war and in arriving at a peace settlement, Canada soon began to participate as an important middle power in affairs of the newly created United Nations, in the North Atlantic Treaty Organization, and in

the solution of such international problems as those related to the partition of Palestine, the Korean War, and the closure of the Suez Canal. On the international scene, Lester B. Pearson, who had been associated with the Department of External Affairs for many years, became increasingly prominent as he moved from civil servant to full parliamentary responsibilities.

Some goals of the government were not achieved during the long period of Liberal rule: patriation of the constitution, agreement on a distinctive Canadian flag, and the cementing of Canada into a truly unified nation. Other goals, however, met a better fate: Canadian citizenship became a fact, appeals from Canadian courts to the Judicial Committee of the Privy Council were abolished, for the first time a Canadian (Vincent Massey) became Governor-General, Newfoundland became the tenth Canadian province, family allowances were introduced, and old age pension provisions were broadened. The concept of social welfare was becoming well established.

Through both private and government encouragement, the arts were beginning to receive greater recognition and support. An important step taken toward the end of the period was the creation of the Canada Council.

During the final years of the period, too, the government supported C. D. Howe, whose contributions during and following the war had been substantial, on two major issues, the passage of the Defence Production Bill and the Trans-Canada Pipeline Agreement. These were contentious matters which, in part at least, were factors in the defeat of the Liberals by John Diefenbaker and his Progressive Conservative Party in 1957.

Readers of the *Alberta Journal of Educational Research* will be interested in statements made by Creighton about education. After a brief description of the extent and nature of education in Canada in 1939, the author states realistically that "The system was entirely appropriate for those who were going on to the universities and the professions; but it was less than satisfactory for those whose education would end with high school or collegiate institute and who would then have to find jobs in an increasing industrialized world." A rapid increase in the birth rate following the war, coupled with a broadened curriculum at the secondary school level, led to growing school enrolments during the fifties. The return of veterans whose education had been interrupted by war and for whose rehabilitation financial incentives were provided led to the large number of mature and highly motivated students who entered universities, colleges and technical institutes in the late forties. An interest in graduate studies led to the provision of further facilities and opportunities.

The organization, the breadth of understanding, the attention to detail, the attractive style and flow of expression make this a compelling book for those interested in developments in Canadian history during the critical years of World War II and the post-war period, 1934-57.

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